Vol. III AUGUST, 1917 No. 8

The INTERNATIONAL JOURNAL OF ORTHODONTIA

A Monthly Journal Devoted to the Advancement of the Science of Orthodontia

MARTIN DEWEY, D.D.S., M.D., Chicago, Ill.
Editor-in-Chief

H. C. POLLOCK, D.D.S., St. Louis, Mo.
Associate Editor

JAMES DAVID McCOY, D.D.S., Los Angeles, Calif.
Editor Department of Dental and Oral Radiography

PUBLISHED BY
THE C. V. MOSBY COMPANY
SAINT LOUIS

$3.00 Per Annum Single Copies, 30 Cents

Copyright, 1917, by The C. V. Mosby Company.

Oral Hygiene Literature

FURNISHED GRATUITOUSLY TO
DENTISTS, SCHOOLS *and* SOCIETIES

The first edition of a new leaflet, entitled "The Teeth and Their Care," is now ready for free distribution, imprinted with the donor's name if desired.

This leaflet is written in simple language, so that children as well as adults may be impressed with:—

The Necessity of Mouth Cleanliness
Consultation with the Dentist at Regular Intervals
and
The Importance of Preserving the Earliest Permanent Teeth, the First (or sixth-year) Molars

In addition to above leaflet, we continue to publish and furnish gratuitously "The Dentist's Patient," of which fifteen million copies have been supplied to the profession, on direct request, in lots of 200 copies.

Sample copy of each booklet mailed on request.

LISTERINE

The antiseptic solution so extensively employed and highly recommended by Dental Surgeons

Manufactured Exclusively by

Lambert Pharmacal Company

Twenty-first and Locust Streets St. Louis, Mo., U.S.A.

The International Journal of Orthodontia

Editor: Martin Dewey, D.D.S., M.D.

VOL. III ST. LOUIS, AUGUST, 1917 NO. 8

ORIGINAL ARTICLES

THE RELATION BETWEEN MALOCCLUSION AND NASAL DEFORMITIES

BY MARTIN DEWEY, D.D.S., M.D., CHICAGO, ILL.

IT has long been recognized that there is a relation existing between malocclusion of the teeth and deformities of the nasal cavity, but there has been some dispute in regard to what relation one has to the other and which is the causative factor and which is the effect. In considering the etiology of malocclusion, we have learned that a certain number of malocclusions are caused by mouth breathing which is produced by abnormal forces of occlusion resulting from a disturbed function of the muscle and abnormal atmospheric pressure. It has also been observed that certain types of nasal deformities are almost invariably associated with certain types of malocclusion, and it has long been recognized that many of these types of nasal deformities can not be improved to any great extent unless the treatment is associated with the correction of the malocclusion.

There are a number of individuals who are suffering from mouth breathing in whom the mouth breathing has undoubtedly been caused by hypertrophy of the lymphoid tissue in the nasopharynx and upon removal of this lymphoid tissue the mouth breathing still persists. This is because the abnormal action of the muscles and abnormal atmospheric pressure during the time the individual has been a mouth breather has produced a malocclusion and along with the malocclusion has been produced a deformity or abnormal development of the nasal cavity. We are then naturally confronted by the question as to what relation exists between malocclusion of the teeth and deformed nasal cavities, which is the causative factor, and which is the effect, and what benefit can be expected to be derived from the correction of malocclusion so far as the deformed nasal cavity is concerned. Considering the relation between malocclusion and deformed nasal cavities, it is well to remember the anatomy of the

parts concerned. It must be remembered that the nasal and oral cavity as they are found in the adult have at one time been a common cavity which may be described from an embryological standpoint as consisting of a single opening at the anterior end of the alimentary canal which is known as a stomodæum. It must be remembered in the early life of the individual that the nasal and oral cavities are one cavity without any separating structure, or, in other words, the

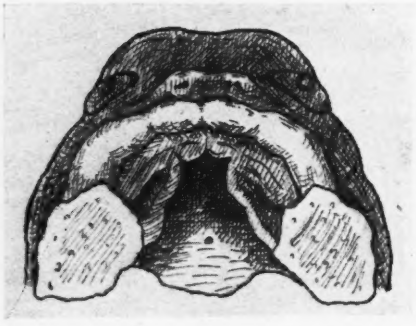

Fig. 1.—Drawing showing embryonic development of roof of mouth.

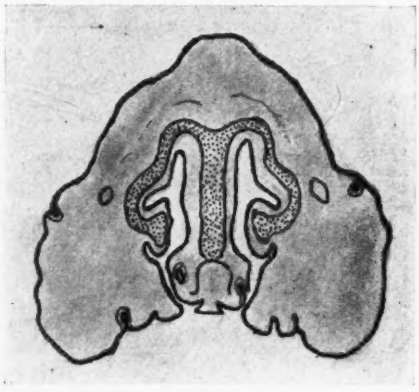

Fig. 2.—Cross section of developing nasal and oral cavity of embryo pig. (After His.)

hard and soft palates have not yet developed to separate the nasal from the oral cavity.

In the development of the nasal and oral cavity we find the first branchial arch and the fronto-nasal process play a very important part. The first branchial arch divides into two parts, one of which is known as the mandibular portion, and is the lower part; and the upper portion known as the maxillary portion

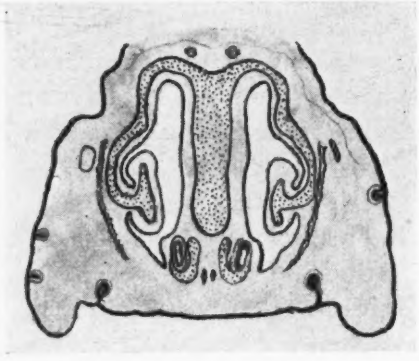

Fig. 3.—Cross section of developing nasal cavity after the union of the palatal processes of the superior maxillæ. (After His.)

which grows from the superior right and left side of the mandibular arch and finally unites with the frontal-nasal bud in that region which may be compared to the lip or alveolar border. From the inner posterior portion of the first branchial arch there grows a shelf or offshoot which finally unites in the median line which forms the hard and soft palate. It is a formation of the hard and soft palate which separates the nasal from the oral cavity.

The developments of these parts can be observed in Fig. 1, which is copied after His. Another structure or development which must be considered in relation to malocclusion and deformity of the nasal cavity is the development of the nasal septum, the turbinated body shown in Fig. 2. Growing downward from the base of the cranium, or from the chondro-cranium, is a cartilaginous structure or rather structures which make up or contribute to what is known in later life as the nasal septum. Growing down from the horizontal plate of the ethmoid is the perpendicular plate of the ethmoid, which grows downward into the nasal cavity towards the median line or the junction of the hard palate. From the base of the sphenoid we find another cartilaginous structure which grows forward and which is known as the cartilaginous vomer. It is later replaced by intramembranous bones developing on the right and left sides of the cartilage. Associated with the perpendicular plate of the ethmoid and the vomer we have

Fig. 4.—Posterior view of nasal cavity showing bony cavity which contains the nasal septum.

a cartilage known as the triangular cartilage which completes what is later known in life as the nasal septum. The downward growth of the perpendicular plate of the ethmoid and the vomer occurs regardless of the development of the lateral halves of the nasal cavity. They occur regardless of the development of the floor of the nose and it is this factor which must be kept in mind in considering the relation of the deformity of the nasal cavity in relation to malocclusion. As the nasal septum grows down from the chondro-cranium the horizontal plate of the superior maxillary bone, which has been developed in the maxillary bud of the first branchial arch grows towards the median line and the structures unite at the median line forming the floor of the nose, the nose being

divided by the nasal septum into the right and left nares. The embryonic development of the nasal septum and the floor of the nose is shown in Fig. 3.

Fig. 4 is a posterior view of the maxillary bone and the mandible showing the bony wall of the oral cavity and the nasal cavity as viewed from the posterior border. It will be seen that the hard palate or the roof of the mouth also forms the floor of the nose. The right and left halves of the nares are made up by the perpendicular plate of the superior maxillary bone or the nasal process of the superior maxillary, while the superior lateral walls of the nose are made up of the lateral masses of the ethmoid. The horizontal plate of the ethmoid assisted by a small portion of the frontal and body of the sphenoid bone forms the roof of the nose. Thus the nasal cavity is formed, completely surrounded by a bony structure and divided by the nasal septum. The nasal cavity is separated into the right and left nares by the nasal septum which has grown down from the perpendicular plate of the ethmoid, the body of the sphenoid, and which grows down toward the roof of the mouth in the median line. The nasal

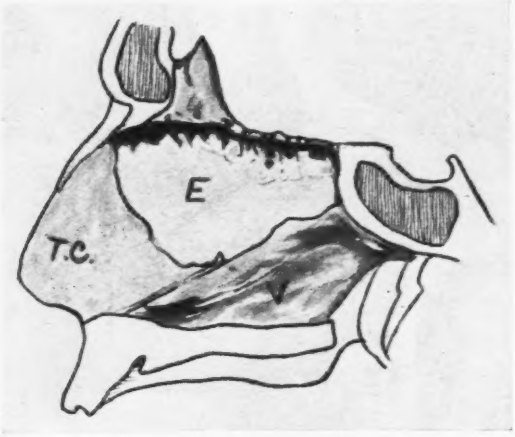

Fig. 5.—Diagram of nasal septum. *T.C.*, Triangular cartilage; *E.*, Perpendicular plate of ethmoid; *V.*, Vomer.

septum is primarily of cartilaginous origin and is replaced by an osseous structure. Physiologically the nasal septum has nothing to do with respiration. From an evolutionary standpoint the vomer was originally a tooth-bearing bone and has been walled off in the nasal cavity during the process of evolution.

As we study this question further we find that the factors which affect the development of the lateral walls of the nasal cavity and the floor of the nasal cavity do not necessarily affect the septum. As a result of this, there are certain types of malocclusion in which the nasal cavity does not develop as rapidly as it should. The nasal septum will continue to grow downward and meeting with resistance from the floor of the nose, will become deflected. Fig. 5 is a diagram showing the various parts of the nasal septum, of which *T.C* is the triangular cartilage, *E* is the perpendicular part of the ethmoid, and *V* is the vomer. It will be observed that the vomer grows downward and forward originally in cartilage and is later replaced by intermembranous bony development on both sides of the cartilage and the cartilage disappears. As a result of this, the vomer may be considered a double structure composed of a right and a left

side. The perpendicular plate of the ethmoid grows downward from the horizontal plate of the ethmoid and joins the vomer and the triangular cartilage. The anterior portion of the nasal septum is completed by the triangular cartilage which is also subject to a great many deformations which may be the result of abnormal development of the nasal cavity as the result of injury. Carefully studying Fig. 5 you will see the nasal septum is enclosed between two bony walls or surfaces which are the roof of the nose and the floor of the nose. The distance between the floor of the nose and the roof of the nose is dependent upon the development of the lateral walls of the nose, the principal portion of which is the superior maxillary bone. Therefore, if any condition arises that inter-

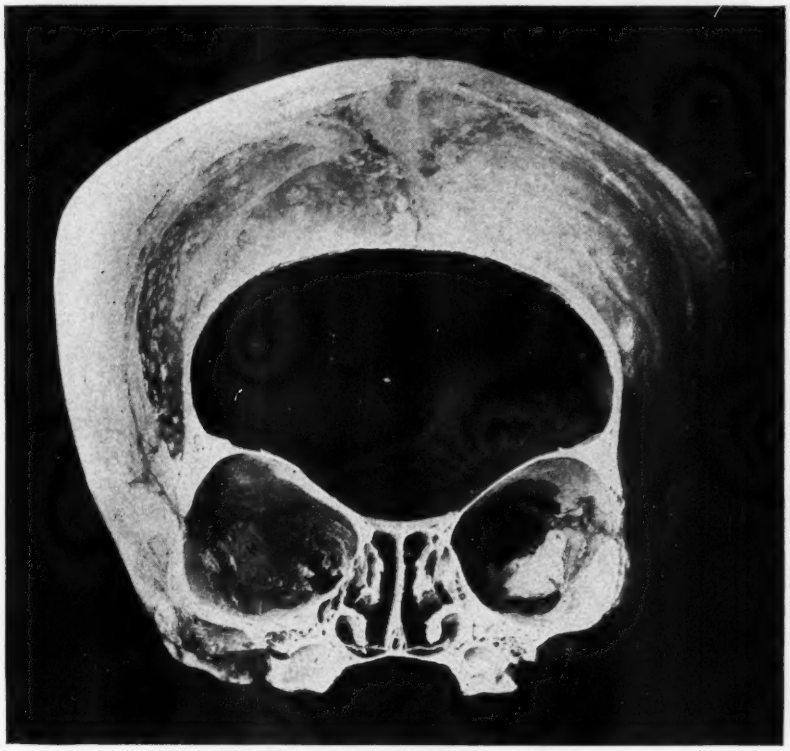

Fig. 6.—Nasal septum enclosed in nasal cavity:

feres with the growth of the superior maxillary bone it necessarily will cause a shortness between the floor of the nose and the roof of the nose. The nasal septum will be compelled to occupy a smaller space than it was originally intended to occupy.

It is also a fact that conditions which affect the development of the lateral wall of the nose do not affect the nasal septum. Therefore, in a great many types of malocclusion we find that deflected nasal septi are the result of the lack of development of the lateral walls of the nasal cavity and the superior maxillary bone which have resulted in a lack of distance between the roof and the floor of the nose. Fig. 6 shows a condition of a fetus skull at birth and it will be observed at this time that the bony septum or nasal septum is enclosed in the bony walls of the nasal cavity. It will also be observed that the roof of the mouth is comparatively flat, that the alveolar process is close to the

orbital cavity, and that there must be great increase in distance between the floor of the orbital cavity and the alveolar process as the individual develops. The inferior turbinated bone is very close to the roof of the mouth or floor of the nose with the result that as the individual grows the nasal cavity increases in length especially between the inferior turbinated bone and the floor of the nose.

As this floor of the nose is carried down by the development of the lateral walls, space is made for the nasal septum and if development goes on harmon-

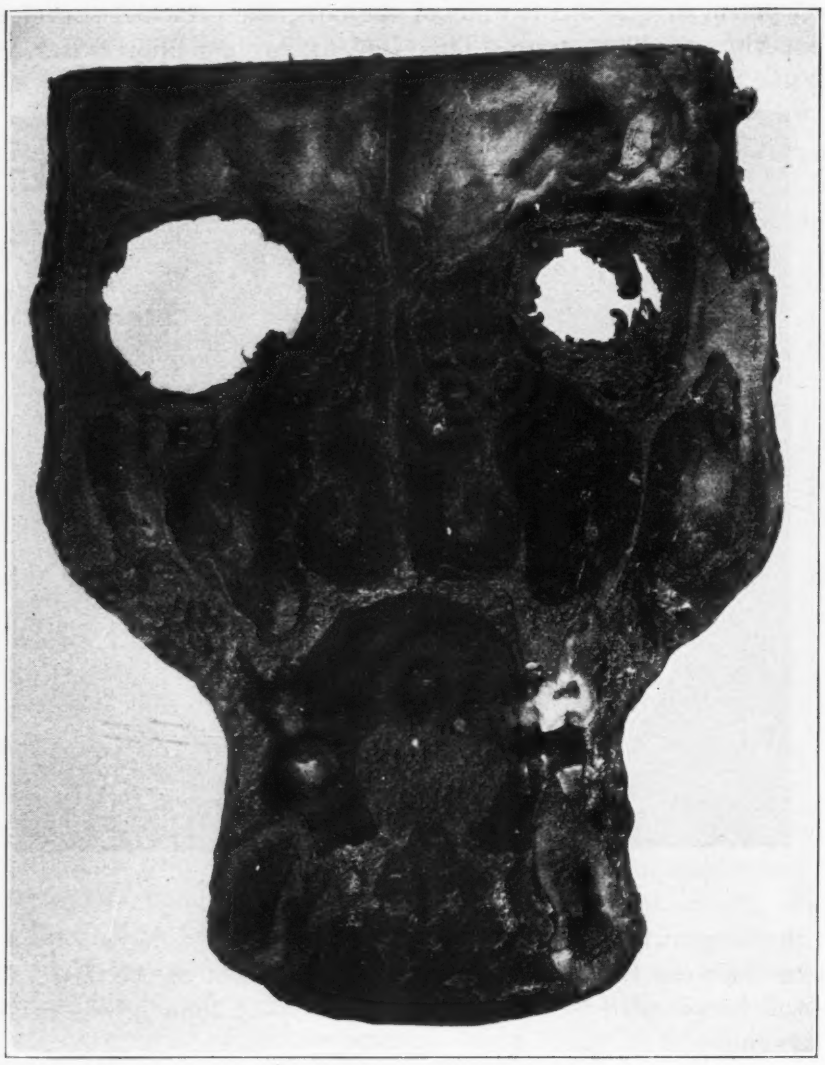

Fig. 7.—Nasal cavity of an adult.

iously, we find a development occurring which in the adult is the same as we find in Fig. 7. It will be observed that there is a tendency for the nasal septum to separate into two parts showing the tendency for the organ to be developed into a right and a left portion.

Fig. 8 is the posterior part of the skull shown in Fig. 7 and it shows the shape of the roof of the mouth, which is a beautiful arch, the development of the maxillary sinuses, and the increased distance between the inferior turbinated

bones and the floor of the nose. This skull may be considered showing a normal development and one in which there is a normal nasal cavity associated with what was a normal occlusion. In certain types of malocclusion which may be neutroclusion or Class I complicated by lack of development of the dental arches, or which may be distal occlusion complicated by labioversion of the upper incisors (Class II, Division 1), or in fact in any individual who is a mouth breather, one is very liable to have an abnormal development of the nasal cavity because of the abnormal development of the superior maxillary bone.

Fig. 8.—Showing double plates of nasal septum.

If the lateral walls of the nasal cavity do not grow down sufficiently rapidly there will be a decrease in distance between the floor of the nose and the roof of the mouth which will result in a deflected septum. The removal of adenoids does not benefit this condition because the only thing that will restore the development of the nasal cavity to the proper size is the treatment of the malocclusion, which will produce the proper growth of the superior maxillary bone and result in changes in the entire nasal cavity. It has long been recognized by a large number of men that the correction of the malocculsion has produced a beneficial result in the deformity or lack of development of the nasal cavity. This observation has led to several plans of treatment, some of which are based

only on the correction of malocclusion with the resulting change in the nasal cavity while other plans of treatment are based on the correction of the malocclusion with the idea of improving the nasal cavity by changing the shape by mechanical interference.

A number of cases reported several years ago by Ketcham showed that in the treatment of malocclusion in patients who were mouth breathers the nasal cavity increased very materially in size and deflected septi disappeared or improved during the process of treatment. Observations made in my practice have substantiated this fact, so I can state that the correction of the malocclusion in the young individual when the superior dental arch is not properly developed will practically remove the deflected nasal septum. It has also been observed in older individuals suffering from nasal stenosis in which there was insufficient space in the nasal cavity, especially in a lateral direction, that by an expansion of the dental arch an increased nasal space is produced and normal breathing becomes possible.

By study of Figs. 4, 7, or 8, from a purely mechanical standpoint, it will be seen that any device or kind of treatment which will expand the dental arch and expand the alveolar process of the superior maxillary bone will necessarily produce some change in the width of the nasal cavity. The change in the width of the nasal cavity can be produced in several ways. It must be remembered that the teeth are embedded in the peridental membrane which is a continuation of the muco-periosteum which covers the floor of the nose and the roof of the mouth, and is made up of white inelastic fibers. By an expansion of the dental arch stress is brought to bear upon the fibers of the peridental membrane which in turn is transmitted to the periosteum covering the floor of the nose and roof of the mouth and this exerts an influence upon the floor of the nose to such an extent that the shape of the floor of the nose will be changed and with individuals who have high narrow arches, the roof of the mouth will be changed in height and width. If the nasal cavity is examined in these individuals before treatment is begun, it will be observed that either the nasal septum is deflected or that there is a lack of width between the lateral walls of the nose.

As the change occurs in the roof of the mouth and the nasal cavity is again examined it will be found that the nasal septum has straightened and there has been an increase in width between the lateral walls of the nose. In other words, there has been a change in the roof of the mouth. It has been made wider and the roof of the mouth is lower from the base of the cranium. Some of this change in the roof of the mouth is the direct result of mechanical pressure while more of it is the result of a growth produced by mechanical stimulation and the result of cell metabolism and changes in the structure as a result of natural growth. It must be remembered that the superior maxillary bone is a bone of environment and responds to mechanical influence and stress; and by changing the position of the teeth so as to change the stress upon the bone, the entire superior maxillary bone will be changed in the growing individual. In fact, a great change will also occur in older individuals which has been observed in my practice. The cases which Ketcham reported and the cases observed in my practice were changes which were produced by ordinary orthodontic treatment, which were the result of slow and gradual pressure upon the teeth without any

direct effort being made to change the shape of the maxillary bone as the result of direct mechanical pressure.

A number of other men have reported cases in which the superior maxillary bone has been changed in shape and in which the nasal cavity has been changed by exerting pressure upon the teeth and the superior maxillary bone with the idea of changing the shape of the roof of the mouth as a result of direct mechanical pressure. This treatment has been based upon the idea that by pressure the median suture between the right and left superior maxillary bone could be opened and as the result of opening this suture a lateral expansion of the nasal cavity would occur.

While I have never followed this plan of treatment in active practice, nevertheless I am convinced that it is possible to open the intermaxillary suture by the construction of special appliances, and, in fact, it may be done in some cases with any appliance. I have done this experimentally upon dogs at different times without any seemingly ill effect upon the dogs and with the result that the bone has filled in the open suture and the nasal cavity has been increased in width. There is no question but that there are extreme cases of nasal stenosis, narrow dental arches with high palate, in which it is desirable to construct some style of appliance especially suited to widen the lateral halves of the superior maxillary bone, not so much with the idea of opening the median suture as with the idea of producing a bodily movement of the teeth and carrying out the lateral halves of the superior maxillary bone as much as possible. This can be produced by constructing appliances which consist of bands placed upon the molars and the canine teeth, or upon the teeth of the two lateral halves of the arches; and then by the use of alignment wires in such a manner that a direct buccal pressure is exerted upon the teeth, they are forced to move bodily thereby carrying the superior maxillary bone or alveolar process with them in a bodily direction.

In young individuals who have only the deciduous teeth or the deciduous molars and permanent molars, the construction of an appliance for the purpose of producing bodily movement is very unsatisfactory if the appliance is attached directly to the teeth, because it will loosen the deciduous teeth. However, we find that cases at that age are the most desirable for treatment and to overcome the difficulty encountered with loose deciduous teeth the use of the plate has been employed to exert pressure upon the alveolar structures through the soft tissue.

The coffin split plate presented some advantages in the treatment of these cases. The idea has later been modified by other individuals including a device which was published several years ago by Ottolengui, and a modification of the split plate which is used at the present time by Richardson. I have seen a number of cases in Richardson's practice in which this appliance has been used and the results have been very pleasing and satisfactory. All the patients report a great improvement in nasal breathing, improvement in speech, and individuals who before this treatment were only able to breathe through the mouth now breathe through the nose entirely during the day and night.

The appliance, by exerting a gentle pressure on the soft tissues, carries the lateral halves of the superior maxillary bone laterally either by direct mechanical

influence or by development. The roof of the mouth is changed, the nasal cavity increased in width and deflected nasal septi are straightened because of the increased room that is made for them. I do not believe that the changes which occur in all of these cases are the direct result of mechanical pressure changing the shape of the parts, but are the result of mechanical stimulation of the cells which produces a development which has been retarded and consequently the parts assume a normal proportion and shape resulting in a normal development of the nasal cavity following the correction or treatment of the malocclusion.

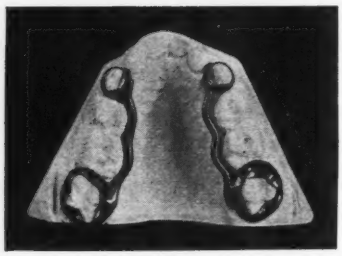

Fig. 9.

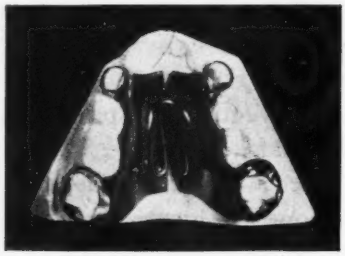

Fig. 10.

Fig. 9 shows a model of a young patient in whom the only permanent teeth present are the first permanent molars with a high narrow arch. These patients suffer from mouth breathing and invariably show deflected nasal septi and nasal cavities which are below the normal width. The removal of adenoids or tonsils which are usually present does not improve the nasal breathing because of the deformed nasal cavity. The appliance is constructed by making bands upon the permanent molars and the deciduous teeth and adjusting a lingual wire which extends from the canine to the molar bands. This wire should be at least a 16

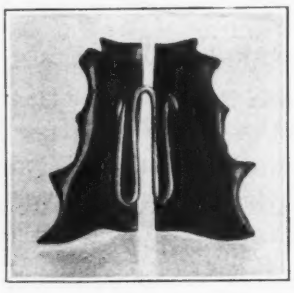

Fig. 11.

Fig. 12.

gauge wire so as to be of sufficient size to enable the roof plate to grasp the wire securely. After the appliance has been constructed, or rather after the bands have been made for the molars and canines, and the lingual wire is put in position as shown in Fig. 9, the roof plate is made in the ordinary manner of waxing up with base plate wax until it is of the desired thickness. A spring of some sort is embedded in the wax as is shown in Fig. 10 and then the plate is vulcanized in the ordinary manner.

This spring, which is embedded in the roof plate, must be made in the form

of a W as shown in Fig. 10 in order to give it a greater range of elasticity and enable it to be so adjusted as to exert a greater expansion either on the canines or molars. If the spring is made in the form of a W, it can be opened and greater pressure exerted on the canines than on the molars or can be opened in the posterior border in such a manner as to exert a greater pressure on the molars than on the canines. After the plate is vulcanized it is separated in the middle as shown in Fig. 11 and then by opening the spring the desired amount of pressure can be produced upon the canines or molars.

Fig. 12 shows the palatal view of the plate which is shaped to fit the soft tissue accurately, and pressure will be brought to bear upon the soft tissue and be evenly distributed and produce no soreness. A groove in the gingival border of the plate catches under the lingual wire extending from the canine to the molar and thereby holds it in position. The result produced by this plate is very gratifying because the loose deciduous molars are moved bodily, the roof of the mouth changes shape, the nasal cavity increases in size and the results from the use of this plate could not be surpassed by any other form of appliance. The treatment produces a change in the shape of the roof of the mouth and the shape of the superior maxillary bone and also produces a change in the nasal cavity. With the use of this plate no provision is made to exert pressure upon the anterior teeth if they are protruding and therefore the alignment wire

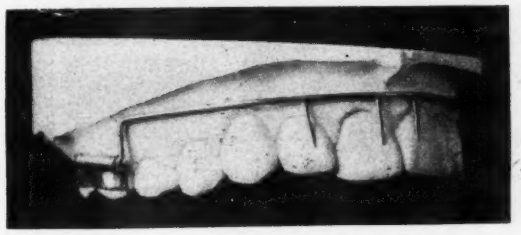

Fig. 13.

must be used to exert pressure on the upper incisors in cases where the upper incisors have erupted.

In young patients in whom the permanent incisors have not erupted, the only kind of treatment necessary at this time is the widening of the superior dental arch so far as the upper teeth are concerned, allowing the deciduous teeth to assume such positions as they will assume as the result of change in the atmospheric and muscular pressure, and the probabilities are, if sufficient space is made for the upper central incisors and the individual is a normal breather at the time they erupt, they will take their normal position. If it is necessary to use an intermaxillary anchorage to correct the mesio-distal length of the arches with the use of this roof plate intermaxillary hooks can be placed on the canine bands to be attached to the lower appliance in the usual manner.

If the patient is more advanced in age and it is desired to bring pressure upon the upper central incisors to correct a protrusion, this can be accomplished by soldering tubes upon the buccal surface of the molar bands which will receive a labial arch as illustrated in Fig. 13. By bending the labial arch gingivally as it leaves the buccal tube it is carried far upon the gingiva and then by using finger spurs pressed against the protruding incisors the appliance is made very

inconspicuous. The use of the labial arch in no way interferes with the action of the roof plate. The appliance is as inconspicuous as any appliance that can be used. Intermaxillary anchorage can also be employed by having the spurs soldered on the canine bands or by having an intermaxillary hook attached on the labial arch. It would be preferable, in using intermaxillary anchorage, to have the spurs attached to the canine band because that would give a greater

Fig. 14.—Showing nasal septum bent from before backward.

rigidity and the intermaxillary rubber would not have a tendency to displace the labial arch as it would if they were attached to the labial arch. The combination of the labial arch with the finger spur, as used by Lourie, employed in conjunction with the roof plate, as used by Richardson, gives a very ideal appliance for the treatment of patients suffering from deformed nasal cavities, narrow arches, and high palates, in which it is desirous to move the teeth bodily

by pressure on the alveolar plates and produce as great a change in the nasal cavity as is possible.

In the increase of width of the dental arch and the increase of space in the nasal cavity, deflected septi are corrected provided the deflection is from above downward. Such deflections as are shown in Fig. 14, from before backwards, and which probably are the result of traumatism, are not corrected or benefited to any great extent by the correction of malocclusion. In beginning the treatment of a malocclusion, it is very necessary that a careful diagnosis of the malocclusion be made, as well as a careful examination of the nasal cavity, in order to recognize the condition of the nasal structures. Then the appliance must be selected with the idea of producing, as nearly as possible, the ideal results. While it is possible to produce a great change in the nasal cavity, care must be taken not to promise the patient too much; and to remember that only certain types of deflected nasal septi can be corrected.

It is my belief that in the majority of cases in which there is a lack of width between the lateral walls of the nose, this can be changed, the nasal cavity caused to increase to its proper size, and a great benefit produced, so far as respiration is concerned, provided the proper treatment is instituted. In a large number of nasal deformities there is nothing which offers so much benefit as the proper correction of the malocclusion with the idea of producing a normal nasal development.

THE HISTORY OF ORTHODONTIA

(*Continued from page* 171.)

By Bernhard Wolf Weinberger, D.D.S., New York City.

W. K. BRIDGMAN, *"On Lateral Pressure," Transactions of the Odontological Society of London,* 1859, contributes the following:

"Lateral pressure is a term usually applied to certain results arising from an abnormal state of the human denture.

"It is by no means restricted in its application, but is commonly assigned as a cause for any particular effect, either of crowding, or decay in the teeth, or any deviation from the normal condition. But, although it is thus the assertion of a fact of a common occurrence it does not appear to have been made the subject of especial attention; nor, so far as I am aware of, has any attempt been made to point out its original source or manner of being produced, or of the circumstances under which it may arise.

"The immediate action upon the teeth to which this appellation is commonly

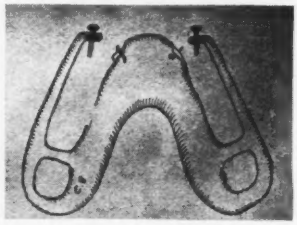

Fig. 1.—After Gaines (1858).

applied, is merely 'the expression of some other and more remote force.' There are three separate and distinct causes whence this force may be derived.

"The first, and most obvious, is that arising from the force of growth—the *vis incrementi.*

"The second is the *vis extensionis,* or pressure caused by the muscles of the cheeks and lips upon the outer curve of the dental arch, and by the expansion of the tongue in sucking, etc., within the arch.

"And, thirdly, the *vis occlusionis,* or under pressure, caused by an imperfect 'bite.'

"We also frequently see the anterior portion of the upper denture rendered unnaturally prominent by sucking the finger or thumb, or by biting the lower lip; and therefore it may be fairly inferred that should any other part of the mouth, under any particular circumstances, be in a position to exert a pressure upon the teeth, it would be followed by corresponding results.

"That such an effect does in reality occur, and that the 'form of the palate,' in combination with the size and shape of the tongue, is the means of producing the particular form of the dental arch by which they are accompanied, has, to me, long ceased to be a matter of doubt.

(*Copyright,* 1917, *By Bernhard W. Weinberger.*)

"But when it can be shown, that with this particular form of the palate vault, the tongue in sucking or in mastication, by its pressure is capable of producing the expansion of the jaws, and that when the palatal vault is differently formed, so that no pressure can be exerted by it upon the teeth during mastication, etc., the expansion of the jaws does not take place, it will scarcely be doubted but that they are in reality to each other as cause and effect. It is, moreover, in the absence of the possibility of this pressure by the tongue within the arch, that nearly all cases of irregularity occur.

"In every variety of form of the dental arch, a particular shape of the palate will invariably exist in connection with some few other peculiarities which are corresponding accompaniments. Thus, where the palate is broad and shallow, the palate processes of the upper maxillæ presenting a considerable area of horizontal surface, and gradually shelving off to the alveolus at an angle of about 45°, the tongue large and broad, the teeth are comparatively small and wanting in boldness of outline, and rarely or never irregular in position, although occasionally producing supernumerary or 'pin' teeth among the upper incisors. But in the opposite extreme, we shall find the palatal vault deep, narrow, and angular; the tongue thick, narrow, and tapering; the alveolar ridge thick, prominent, and almost perpendicular; the teeth large, and fully developed, thickly but unevenly coated with enamel, and bold in outline, but almost invariably more or less irregular in position. Under these conditions in the act of sucking (which becomes extremely difficult, and sometimes almost impossible in the case of a very deep and pointed arch), there will be no lateral expansion of the tongue. All the effort will be drawn up and thickened vertically. Hence the action of the muscles external to the arch will be to press the teeth inwards, and to cause them to assume an irregular line and to overlap one another; the two upper maxillæ in extreme cases having the appearance of being compressed together inwards.

"In the correction of irregularity by the expansion of the arch (and which is extremely easy by pressure applied within the arch), it becomes a question how far this extension can be carried with safety; for if the teeth be placed much within the influence of lateral pressure from the action of the muscles of the face, we run great risk in having them made to decay. The amount of it must therefore be guided by circumstances; for although we have hitherto contrasted only the extremity of both forms, others will be found merging from one into the other in every stage of graduation, with more or less difference in their relative portions.

"In the third and remaining source of lateral pressure, its occurrence may be attributed to accidental circumstances producing imperfect antagonism of the teeth.

"In a perfect 'bite' we have everywhere a series of inclined planes in opposition.

"The proper antagonism of the teeth is of the very utmost importance, for if any of the 'cusps' be out of place, they disturb the equal distribution of the force in biting, and tend to produce mischief at the points holding those cusps in their assumed position. In regulating the mouths of children, it is of far

more consequence to secure correctness in this respect, than as to the actual number remaining, provided the symmetry of the anterior portion of the denture be not interfered with."

John Fletcher.—On page 213 of the same journal we find reported a paper read before the Odontological Society of London, by Fletcher on *"Mechanical Appliance for Reducing Irregularity."*

"For my own part I prefer getting the teeth into position at as early an age as I possibly can: although frequently attended with much greater difficulty, the advantage of the teeth being directed into the proper position, while the process of the new formation is in vigorous operation, fully compensates for any extra trouble the case may possibly have given, but it most frequently occurs that we have not this choice given us, and besides cases have been most successfully treated up to twenty-five, and even thirty years of age.

"Formerly when the position of a tooth was required to be moved, recourse was had to a gold plate, or bone-piece fitted to the mouth, which was used for drawing the teeth inwards by means of silk ligatures passed through holes made in the plate, and tied over the teeth; or by means of a spiral spring, one end of which was attached to the plate, and the other by means of a ligature, tied to the tooth, whereby a constant tension was kept up.

"For the purpose of drawing a tooth forward, a stout gold bar was made, and kept some little distance in front of the tooth to be brought forward; the ends of the bar being tied to the back teeth, silk ligatures were passed around the tooth, and through holes in the bars, drawing the tooth forward.

"I capped with gold the back teeth of the under jaw, uniting the caps on both sides of the mouth by a narrow, stout, gold band, passing in front and resting against the anterior teeth, to the buccal sides of the caps; to the side of the cap from about the second bicuspid to the first half of the first molar, was soldered a stout piece of gold plate, projecting upwards about half an inch, cut at about an angle of sixty degrees, sloping upwards from the bicuspid to a parallel line from the middle of the molar. The upper plate was made capping the back teeth, and covering a portion of the lingual surfaces of the anterior teeth. A small thick piece of gold was soldered to the buccal sides of the caps, into which was screwed a strong gold pin, which, on any effort to close the mouth rubbed against the inclined edge of the under piece, forcing the under jaw back. As the caps came into contact, the points were filed away, until the teeth themselves nearly met.

"This I adopted in preference to the strap on the chin and strong elastic bands carried to the back of the head, which I had found considerably increased the inconvenience to the patient, and was much less effective in its operation.

"Another plan is sometimes used for the upper central incisors, where, from the persistence of the temporary teeth, the permanent have made their appearance considerably on the lingual side of the alveolar ridge. This is very simply remedied by means of a piece of bone fitted against and rather beyond the edges of the growing teeth, which, as they descend, the thicker part of the teeth rubbing against the bone, forces them forward into their proper line.

Nature might possibly correct this state, if the under teeth did not interfere on closing the mouth.

"A very useful and effective method of sustaining pressure on any part of a tooth is frequently resorted to, especially for the purpose of turning it, by means of a piece of flat gold plate."

Edwin Sercombe, Transactions of the Odontological Society of London, page 218, describes a plan he adopted for expanding *the arch of the mouth.* "It consists of capping the two first molars, and connecting the caps by means of a gold bar across the palate. On the buccal sides of the caps is attached a strong elastic band, which passed in front of the central incisors, and was attended with complete success in the case in which it was used. The band is occasionally made to press against the lingual sides of the molars and bicuspids for the purpose of expanding the arch of the mouth, and which I have used most successfully in some of the most difficult cases.

"By means of two gold plates fitted to the grinding surfaces of the bicuspids and first molars, and connected by a spiral spring keeping up a constant pressure outwards, he afterwards fitted a bone plate to the hard palate; on to the bone was riveted a piece of metal, to which was soldered four grooved pieces, for the purpose of carrying compressed hiccory in order to force the anterior teeth forward. And in another case he succeeded in drawing into line a lateral incisor and cuspid by means of a bone-piece, to which he attached elastic bands, one passing through a hole cut in the bone for the purpose of keeping the band on the cuspid, which was only partially erupted."

W. A. Harrison in the same article says: "By taking a piece of dry willow, or any fine-grained wood, that is as free from resin as possible, and compressing it by screwing it up between the jaws of a parallel vise for about forty-eight hours, occasionally, as it becomes compressed, screwing the vise up more.

"A bone-piece is fitted to the mouth, and behind the tooth to be brought forward is cut a slot, or groove, the width of the tooth; the edges of the groove are slightly undercut, to retain the wood into position; that end of the groove which approximates to the gum is cut somewhat deeper; consequently, when a piece of compressed wood of equal thickness is slid into the groove, with the fiber of the wood parallel with the tooth, on absorbing moisture it expands, and the pressure comes first on the edge of the tooth, where it can exert the greatest amount of power. When it has pressed the tooth out as far as it possibly can, another and thicker piece of wood is substituted, and so on, until it may be found requisite to fit another bone-piece to the retreating tooth, and continue the same plan.

"The way in which the compressed wood is used for drawing a tooth back, is by cutting a small recess on the lingual surface of the bone-piece behind the tooth to be drawn back. Into the recess is placed the wood, the fiber parallel with the tooth, and over the wood a small piece of gold plate, and over the plate a ligature, passing through holes on either side of the recess. The ligature is then made fast over the tooth, on which the expanding wood now acts. The bone may be left sufficiently deep to prevent the antagonistic teeth from being obstructive, and at the same time mastication is but little impeded, and the incumbrance to the mouth is much less than when spiral springs are used,

and more convenient and less unsightly than when gold bars are brought in front of the teeth. "

James Robinson describes in *The Dental Review,* London, 1859, *"The Causes of Irregularities of the Teeth,"* page 268:

"Irregularities of arrangement can only be properly said to affect the second set of teeth, and are of two kinds, temporary and permanent. The first arises from too rapid an advancement of the permanent teeth before a corresponding absorption of the fangs of the temporary has taken place, so that the former, meeting with an obstruction in their progress through the gums, are forced into irregular and unnatural positions, and pierce the gums either before, behind, or on the sides of the temporary teeth. The permanent irregularity arises from a contraction and malformation of the maxillary bones, in which a deep declivity is usually observed in the arch of the upper jaw, together with the increased size of the permanent teeth, as compared with the first set, and their development before a sufficient growth, or expansion, has taken place, in the maxillary bones, to permit of the teeth piercing the gum in a regular manner."

Page 272: "The neglect of removal of the deciduous teeth at the proper period is also a common source of irregularity of the second denture, and one which parents too frequently neglect, by not regularly consulting and placing their children under the care of a dentist; in fact, if parents would only adopt a systematic proceeding with their children, as they do in education, dress, etc., by visiting their dentists at stated periods, we should be seldom called upon to have recourse to our mechanical ingenuity in the arrangement of permanent teeth by mechanical contrivances; and the time is not far distant, we trust, when every well-conducted school and family will have its dental practitioner attached, in the same manner as they have medical men, professors of music, drawing, etc., in which case society would seldom be shocked with the egregious personal deformities, imperfect articulation, and premature loss of one of the most valuable adjuncts of personal beauty and of health."

Page 334: "The too early extraction of the deciduous teeth, before the permanent are sufficiently developed to take their places, is also a cause of serious irregularity; and in some of these cases an irremediable and permanent deformity is produced by the contraction of the alveolus. The growth and advancement of the dens sapientiae, when an insufficiency of space exists for its development, is not only a source of great suffering, but frequently the immediate cause of irregularity by the pressure exerted towards the anterior part of the mouth, which until their development presented a regular denture."

Page 481: "There are some cases of these projecting teeth in which it is advisable to try the results of mechanical treatment, particularly where there exists a well developed arch, and a separation of the teeth. For the treatment of such cases many mechanical contrivances are employed; one consists in striking up a plate, made to extend over and cap the whole of the teeth, from the bicuspids on each side to the second molars. Upon this plate, immediately over the first molar, is fitted and riveted a piece of dentine, of a sufficient height to prevent the usual approximation of the jaws to their former position. On the inside of the mouth the plate extends behind the teeth, being cut away from

the back of the protruding organs, as otherwise it would counteract the effect of a bar that has to be soldered on from the second bicuspid, and extended to the corresponding tooth on the opposite side, which is intended to produce the necessary pressure when the mouth is closed. This bar has to be adjusted and made to fit tolerably tight in front of the projecting teeth, and extends a line or so from their cutting edge.

"As the teeth are pressed backwards, the piece will necessarily become loose; the bar must be readjusted to their altered position, or the intervening space be filled up, by drilling holes opposite the irregular teeth, and fastening on to the bar pieces of India rubber. These appliances answer for a time, but ultimately a new plate must be adjusted to such altered position of the teeth."

Page 482: "The following drawing (Fig. 2) will explain my observations upon this subject, and I will now endeavor to describe the various improvements that have been introduced for the same purpose.

"In cases where the central and lateral teeth had been developed within the dental circle, and it was necessary to exert posterior pressure to force them

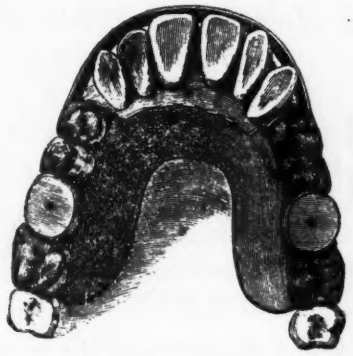

Fig. 2.—After Robinson (1859).

outwards, this was effected by fitting a piece of dentine to a model of the anterior part of the palate, and the internal surface of the upper teeth, extending behind the four incisors and canines, beyond which it was carried over the crowns of the bicuspids and first molar on each side, to prevent the usual approximation of the jaws. Immediately behind the irregular teeth was screwed into the dentine pieces of strong gold wire, which were turned and flattened presenting a button-like surface to the posterior part of the irregular teeth, with which they were brought into contact by the approximation of the two jaws. The bone palate was retained in its position either by gold clasps or ligatures of dentists' twists tied to either the bicuspids or molars. As the teeth were pressed outwards the gold wire-studs were lengthened until the cure was completed.

"Very often in difficult cases two or more bone palates were required, and the compressed hickory substituted for the gold stud. These mechanical arrangements answered their purpose, but the cases occupied so much time, and the patient had to be seen so frequently, that I substituted for gold studs, screws and hickory pegs, which exerted a continuous mechanical pressure upon the irregular teeth.

"This consisted of a stout spiral spring made of flat wire, rather stouter

than is generally used for making the ordinary spiral spring for supporting a full set of teeth, but not so closely coiled, and contained in its full length about five to eight turns of the wire upon a mandril the size of pin wire, at the end the wire was bent outwards so as to form a hook, at the other end the coil was contracted. A pin was now made of a piece of sixteen carat wire, upon which was soldered a button of fine gold. The pin was then placed in the center of the spring at the contracted end, and secured by a little pewter solder. The whole was now placed in a gold tube of nearly the same size as the spring. At the side near the bottom a small hole was drilled to receive the end of the coil, which had been bent and made to fit the hole in the tube, and thus secured the spring to the bottom of the tube. A hole of the same size as the tube was now drilled in the bone, which must be left much thicker opposite the irregular teeth, and the tube containing the spring is fastened either by means of a screw or pin inserted into the bone at the posterior part of the tube.

"When placed in the mouth, the button should be pressed backwards in the tube, and then allowed to come forward in contact with the irregular teeth. The piece is fastened by drilling holes on each side in the bone, either opposite the neck of the second bicuspid or first molar, and tying the piece to these teeth.

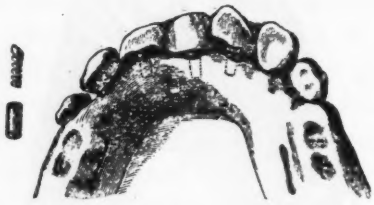

Fig. 3.—After Robinson (1859).

Whilst being secured the patient should close the mouth firmly on the piece to keep the spring in its proper position." (Fig. 3.)

Page 535: "To the palate and gum is accurately fitted a gold plate, extending as far as the first bicuspid tooth on either side. To sustain the plate in this position, holes are drilled, and ligatures of dentists' twist, or the dried gut of the silkworm, are passed through the holes and fastened to the neck of each bicuspid tooth, or the first molar, if the plate be extended so far. By firmly securing the plate as described, the requisite traction can be exerted in any direction. To obtain this continuous traction it is necessary to coil a piece of gold wire into the shape of a spiral spring, which is to be attached to some point near the posterior margin of the plate, the spring being put in a state of tension by a ligature fastened around the irregular tooth, and secured to the coils of the spring; the other end of the spring is fastened at such a point of the margin of the plate as would give the desired traction by soldering into the plate a piece of gold wire the size of the spring, and turning it at right angles."

Page 538: "A plate of gold is constructed which extends over the anterior part of the palate from the first molar on either side, over the crowns of which the gold is carried, and down to the neck, at the side on which the irregular teeth are situated. A tube of gold is there soldered for receiving a piece of flattened elastic wire, which is rounded at one end to fit the tube, into which it is inserted, and when placed in action it will act as an elastic lever. The wire

should be carried opposite the irregular teeth, the end of the wire should be flattened so as to pass between the teeth at the side to be turned. At the same time, if necessary, the lateral can be brought inwards by either slightly bending the bar opposite the tooth, or fastening on the bar a piece of gum elastic, so as to exert pressure when it is in action upon the tooth. To prevent the approximation of the teeth in their former position, a piece of dentine is riveted on the gold cap at either side. As the tooth is turned, the bar is shortened from the socket end, so as to keep up a continuous leverage until a cure has been effected, and the desired direction obtained."

Page 592: "The most simple to rectify is when the two permanent centrals in the lower jaw are developed wide apart and the laterals advancing posteriorly —the temporary canines still remaining in the jaw leaves no space for their regular development; in such cases the application of the india-rubber ring will be sufficient to bring the centrals in contact—after which a ligature of silk will be all that is necessary to keep them in their position until the laterals are sufficiently advanced to support them.

"In those cases in which the centrals have been developed externally to the dental circle in the lower jaw, and the corresponding teeth at the top close behind them, the following apparatus may be employed.

"Instead of the plate a flat or circular spiral spring or india rubber ring may be substituted; if the former, each end of the spring should be fastened to a piece of gold wire, bent at right angles, and soldered to the outside of the plate on each side, opposite the first molar, and as the teeth are forced inwards the spring is reduced in length, in the same manner as that employed for the reduction of projecting centrals; the shortening of the spring is continued until the irregular teeth are brought behind those in the upper jaw, when the mouth is closed. In cases where the central tooth in the upper jaw approximates behind a central in the lower jaw, and by its malposition forces the lower out of the dental circle, a compound irregularity, it may be said, is produced, as shown in the accompanying figure.

"To meet this case an inclined plane is employed, which will operate for the reduction of both teeth, at the same time a plate is made which should cover two or three of the incisors, and extended to the first molar on each side, capping each of the teeth. The plate is made to line the external and internal surfaces of the teeth down to the margin of the gum.

"Upon the edge of this plate the inclined plane is soldered so as to operate upon the upper tooth when in action. Before its insertion two holes are drilled through the inside portion of the plate, and a piece of stout twist passed through, so as to form a loop, which embraces the irregular lower incisor and secures it to the plate. A ring of vulcanized india rubber will be generally found preferable, by merely substituting a screw pin for the holes on the inside. By this mechanical contrivance we are forcing the center out, at the same time bringing the lower tooth within the circle, and the approximation of the upper in a short period will be over the lower tooth, when the cure will have been effected."

C. N. Pierce, in the *Dental Cosmos* for October, 1859, under *"Regulating the Natural Denture,"* says:

"I would not say that under any circumstances it would be improper to

remove one of these teeth, but I believe, as a general rule, and one acknowledged by all intelligent dentists, they should be preserved, even at the sacrifice of the more posterior ones. The reason for this, in addition to preserving the beauty of the countenance, is the durability of the teeth.

"If young men in the profession would be careful to observe a few things before attempting to remedy malpositions of the teeth, they would save themselves some moments of regret, and probably some censure. (1st) The age of the patient for whom the operation is to be performed. (2nd) The relative durability of the teeth at that age. (3rd) The physical condition of the teeth to be corrected, and the adjoining ones. (4th) The manner in which we have the jaws articulating. The reasons for observing the first three are obvious from what has already been written. The fourth I consider of equal importance; for, if we find irregularity of the upper anterior teeth, with the lower ones occupying their normal position by closing entirely posterior to them, the course to be pursued is quite different from where we have them closing anterior to the upper ones. In the former position, even though we should correct by enlarging the arch, and preserving all of the teeth, we should have the under ones so far posterior to them that it would be almost impossible to keep the upper ones in the regular position to which they had been forced by means of plates, springs, ligatures, etc.; for such is their tendency to fall back into the places assigned them by nature, that the moment our mechanical appliances are removed we should have them fast assuming their former position. I think it might be set down as a rule in practice, that where we find irregularities of the upper anterior teeth with the jaws preserving their natural articulation, it is useless to spread the arch (unless it were both practical and essential to bring out the under ones proportionately to preserve the symmetrical contour of the face) in order to correct the difficulty, but resort at once to the forceps for the purpose of procuring the desired room. If we have irregularities in articulation either complete or partial, then another course of treatment may be necessary."

J. Foster Flagg, page 180 of the November issue, 1859, of the *Dental Cosmos,* stated that the causes of irregularity were hereditary and mechanical; "the hereditary generally affecting the incisors while the mechanical causes influenced the bicuspids, the cuspidati being about equally affected by both.

"The treatment consisted in removing all the second bicuspids, above and below, throwing India rubber tubing ligatures around the six-year molar left inferior, and the left inferior first bicuspid and cuspid, drawing the two latter backward and into the arch, at the same time passing a silk ligature around the lower incisors in such a manner as to force into position an overlapping left central. In the upper jaw a plate was adapted to the palate, secured by silk ligatures to the first permanent molars; pins were placed in the plate in such a manner as to allow of the attachment of two elastic bands, which were secured by silk threads to the central incisors, drawing upon the mesial face; other bands were so arranged as to draw upon each lateral angle of the centrals, passing between the centrals and laterals from their palatine faces, and running along the labial and buccal faces of the teeth unto the first molar of either side; tubing was thrown around the remaining superior bicuspid of either side

and the molar, for the purpose of approximating these teeth, thus affording space for the proper placing of the irregular centrals."

E. C. Angell. (Through some mistake the article reprinted from the *San Francisco Medical Press* in the *Dental Cosmos,* the initial "C" was changed to "H" and printed as E. H. Angell.) In the April, 1860, issue of the *San Francisco Medical Press,* page 83, and the July issue, page 145, Angell contributes several advanced, as well as remarkable, ideas in regard to correcting irregularities of the teeth. The same idea has recently been reintroduced by several men as the "rapid separation of the maxillary suture."

Angell emphasized the importance of the first permanent molars, being the first to note the eruption of these teeth, their importance, and the necessity of their retention, as well as all of the permanent teeth in order to establish "correct occlusion of the teeth."

He describes first the eruption of the various teeth in the permanent set, and the approximate age of their eruption. This was probably the first time on record that anyone advocated the opening of the median suture to provide space in the dental arch in order to establish occlusion. He describes in detail the various steps taken to accomplish this end and the appliance used, namely, the jack-screw.

"These teeth, four in number, are the first of the permanent set to take their position in the mouth, and are usually developed and admirably articulated before any of the primary teeth have fallen from their sockets. Nature has thus in her munificent wisdom, provided a sure and unerring guide, to the correct occlusion of the jaws, despite the loss of the deciduous set. By the presence of these organs, correct articulation is preserved; while without them, there is no security against deformity and distortion of the features. At the early period at which these teeth are permitted to be destroyed, the inferior jaw may incline to either side, or instead of staying in its place, may assume the deformed position, denominated underhung; in which the inferior incisors shut outside the superior. The distortion of face, and ugliness of countenance, resulting from the early loss of these teeth, would severely tax the science of mathematics to compute.

"One of the modes of treatment frequently employed when these teeth begin to make their appearance, and it is ascertained that there is not adequate space for them to occupy, is to remove them as soon as they can be taken hold of with the forceps, and thus deprive the mouth of two of its most ornamental, and at the same time, most serviceable organs. Another is the removal of the first bicuspids, and the employment of pressure to bring the cuspidati into their places; and still another is the removal of the second bicuspids, when the first are moved back, and the cuspidati, as in the former instance, drawn into the arch.

"If the teeth are sound, and I am to treat this class of irregularity, and have the case in charge as soon as the cuspidati have made their appearance, I employ neither of the foregoing methods; but by an apparatus simple and efficient, proceed at once to widen the jaw, and expand the maxillary arch, so as to admit the teeth to the place nature intended them to occupy. The time necessarily involved in this expansion at the age above indicated, by the ap-

paratus in question need not exceed two weeks; after which it is only necessary to preserve the space secured until the complete eruption and development of the teeth in question.

"The opinion seems to have become almost universal that the extraction of one or two of what are usually called back teeth is a matter of no moment so long as the vacancies are not discovered in opening the mouth, yet to remove these one or two, is to remove the keystone of the arch, and is generally the beginning of the undermining of the whole denture. The loss of one of these teeth from either side is not the loss of one tooth merely, for the destruction of the opposing organ will ordinarily soon follow. In the occlusion of the jaws, nature has provided the teeth and their sockets with the ability to resist the no inconsiderable pressure exerted upon them by the combined action of the several muscles employed in mastication. To remove one tooth, therefore, is to remove its antagonist from the influence of this muscular action, and, as a consequence, it continues to protrude further and further into the mouth, until it has little or no socket to sustain it. Nor is the protrusion and consequent loss of the articulating tooth the full extent of the injury resulting from

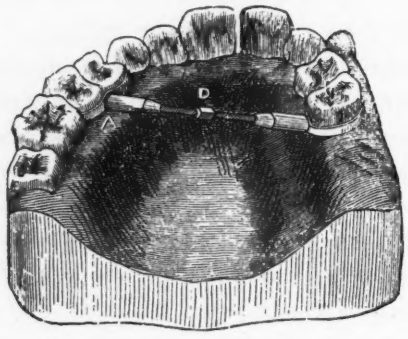

Fig. 4.—After E. C. Angell (1860). Illustrating perhaps the first method of separating the suture.

this first extraction. The time-honored theory of the ancients, that 'nature abhors a vacuum,' would seem to be fully demonstrated in the effort of the teeth on either side to come to the rescue and heal the breach. To such an extent does this approximation occur, as often to annihilate the spaces in the posterior portion of the mouth, and generally at the expense of the teeth more anteriorly situated, so that the spaces, the idea of which would so much horrify, have come though ever so unwelcome. From the extraction of a second superior molar, it is not uncommon to find, months after, its place partially occupied by the first molar, and a corresponding retreat of the bicuspids and cuspidati, leaving sufficient space between the latter, and the lateral incisor, for an additional tooth, giving the same impediment to articulation and impairing the expression of the face as effectually as would the extraction of one of the anterior teeth. If, therefore, the adult has been so unfortunate as to suffer the loss of a first or second molar, its place should be skillfully supplied to secure the remaining teeth in their respective positions.

"For this purpose I adapted to the lingual surface of the bicuspids of the right side, collars of gold, with linings of pure gold, that the contact might not injure the enamel. To these collars, which united between the teeth, was

soldered the tubular nut marked *A,* Fig. 4. The thread in the nut was sufficiently extended to prevent any rocking motion. On the left side, similar collars were not admissible, as the first bicuspid could not be moved outward without moving the cuspidatus further out of place. I therefore adapted to the second bicuspid a clasp similar to those usually employed for retaining plates supporting artificial teeth. By means of the latter, which, like the collars, was lined with pure gold, the fixture was prevented from sliding during mastication. To this clasp was soldered a second tubular nut, differing only from the first in having a left hand thread. The threads on the shaft marked *D,* were cut to correspond with the nuts. The middle of the shaft was made square, to which was fitted the key or wrench, as seen in diagram 3 (Fig. 8). This was made from a dime, the silver being strong enough to turn the shaft, without being hard enough to bruise it.

"This apparatus was placed in the mouth, when the shaft was made to revolve until the fixture was made comfortably firm; when the patient was provided with the key, and instructed to keep the shaft as uniformly firm as possible. Those directions were industriously followed, and at the end of two

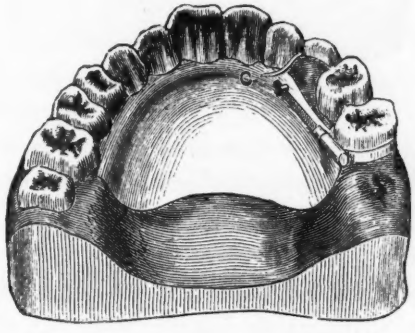

Fig. 5.—After E. C. Angell (1860).

weeks, the jaw was so much widened as to leave a space between the front incisors, showing conclusively that the maxillary bones had separated; while the left lateral incisor had been brought completely outside the inferior teeth. The plate (as seen in Fig. 5) was next adjusted to the mouth, the molar and bicuspid of the right side having been moved apart, so as to admit a clasp adapted to the molar. A collar was extended from the plate to the posterior proximal surface of the lateral incisor. A nut was soldered to the plate, at the point near which the collar was attached, through which a smaller shaft, having a thread corresponding to the nut, was made to revolve. To the opposite end of this shaft was affixed the common chain swivel, to which was soldered the original clasp, affixed to the extremity of the first shaft.

"The maxillary arch being sufficiently widened, the next step was to move the bicuspids posteriorly, until sufficient space had been secured to receive the cuspidatus. This apparatus was placed in the mouth, and the patient again provided with the key, and instructed to apply it often enough to keep up a uniform pressure. In this instance we had a larger resisting surface than in the former; consequently our progress was slower; besides the patient was kept at home for a time from a severe indisposition induced by an epidemic, preva-

lent at the period. My impression, however, is, that the second bicuspid might have been moved sufficiently for our purpose in two weeks, without difficulty, or causing any material inconvenience to the patient. The first bicuspid followed of its own accord a part of the distance.

"The rotating shaft was now removed, and a spring was soldered to the plate at the point to which the nut was originally affixed; and from which it extended, so as to press upon the anterior proximal surface of the first bicuspid, as seen in Fig. 6. This spring in a few days moved this tooth so as to leave sufficient space to receive the cuspidatus. The original collar adapted to the

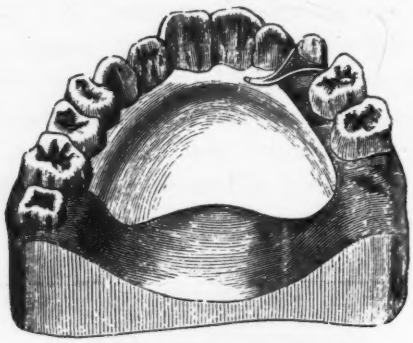

Fig. 6.—After E. C. Angell (1860).

posterior proximal surface of the lateral incisor was extended and curved so as to press upon the labial surface of the cuspidatus, and within a week from this application we had the satisfaction of seeing it within the arch it was originally intended to occupy.

"To the best of my knowledge, this is the first instance in which an apparatus of the character in question has been employed for correcting irregularities of the teeth. At the Annual Dental Convention assembled in Boston in 1857, Dr. W. H. Dwinell, of New York, spoke of the employment of the 'simple screw and nut, in conjunction with plates,' for the correction of irregular teeth.

Fig. 7.—After E. C. Angell (1860).

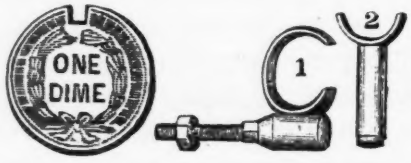

Fig. 8.—After E. C. Angell (1860).

He also stated that he had met with great difficulty in making fixtures that were strong enough, while they were sufficiently small to be practicable, until he had employed steel screws, with zinc attachments to prevent rust. In using the simple shaft as employed in the foregoing case, independent of any plate, there is no difficulty in making the apparatus of sufficient size and strength to widen the maxillary arch of even an adult. The shaft in question was made from sixteen carat gold wire, No. 13, according to Stubbs' gauge. Finer gold may be used: for instance, that alloyed with platinum as usually employed for

clasps; but this is inferior to the first, as its hardness renders the cutting of a good and perfect thread more difficult.

"I have since employed the same style of apparatus with equal success in correcting irregularities of the incisors when they overlap each other. For this purpose I employ an apparatus as represented in Fig. 7. The collars at either extremity are intended to rest upon the palatine or lingual surface of bicuspids, when the wrench is applied to the shaft as already described. In these cases it is only necessary to secure sufficient space, when the irregular teeth may be turned in their sockets without difficulty, and may be as easily fixed in correct positions. When the cuspidati are both outside the arch, and the patient is not too old, so as to render the treatment impracticable, the apparatus should have a single collar at each extremity, as seen in Fig. 8-2, which represents a tubular nut with collar affixed.

"These collars should rest upon the palatine or lingual surfaces of the second bicuspids, as the first can not be moved outward without augmenting the difficulty sought to be corrected. When the arch has been sufficiently widened, the first bicuspids may be moved posteriorly by the apparatus exhibited in Fig. 8-1, the nut through which the shaft revolves being soldered to a plate adjusted as described in Fig. 5. When sufficient space has been secured for the admission of the cuspidati, they may be brought into the arch as already described.

"The uniform and gradual pressure exerted by this apparatus can not fail to commend it in the strongest terms for correcting the general irregularities of the teeth. It offers but little impediment to articulation, and the ease and rapidity with which it accomplishes the work is as gratifying to the patient as it is satisfactory to the operator."

The Editor of the *Dental Cosmos,* May, 1860, in reviewing the above article doubted the feasibility of the rapid separation of the suture and in the light of our present knowledge it may be of interest to those who are following this history.

"We are pleased to have an opportunity of presenting it to the readers of the *Dental Cosmos,* as there are several valuable suggestions in it; but must beg leave to differ with the writer in the conclusion arrived at, that by the use of the apparatus described he succeeded in separating the superior maxillæ from each other. With no disposition to assert that such a thing is utterly impossible, yet, when taking into consideration the anatomical relations existing between the right and left superior maxillæ and the other bones of the face with which they articulate, such a result appears exceedingly doubtful. Even admitting the impression of the writer to be correct, it would be a very strong argument against the use of such an apparatus; for surely the irregularity of the teeth is a trifling affair compared with the separation of the maxilla, which could not take place without inducing serious disturbance in the surrounding hard and soft parts. Doubting the possibility of effecting the separation, we can see no objection to the employment of the apparatus, and indeed believe that it will be found very useful in correcting many cases of irregularity."

J. H. McQuillen, page 170 of the *Dental Cosmos,* October, 1860, in reviewing this article, says:

"With due respect to the opinions of the dental as well as general surgeons

of no 'inconsiderable eminence,' who appear to have been perfectly satisfied by merely examining 'the models of the case,' that the maxilla had been separated, and with no disposition to question the veracity, much as we may differ in opinion with the writer, we would take the liberty of stating that such evidence, however satisfactory it might be to others, would be insufficient to us. We should desire to examine the mouth and pass a finger along the roof, and expect to find, if an actual separation had taken place, the palate not merely reddened, but quite soft along the raphé. In addition to this, on grasping the right and left superior maxilla between the thumb and forefinger on each hand, we should expect to find them quite loose; and, according to the direction in which the force might be applied, whether inward or outward, that they could be brought together or separated.

"Although the writer regards the separation of the maxillary bones as a matter of the highest moment in this branch of dental surgery, and predicts his opinion, that he succeeded in accomplishing it, upon the fact that the central incisors were separated when the force was only applied to the bicuspids; it is not difficult, when taking into consideration that the alveolar process contained by far the largest proportion of organic matter of any other part of the osseous system, to account for the space obtained—three lines, or one-fourth of an inch between the bicuspids, and one line or one-twelfth of an inch between the central incisors—by attributing it to the yielding character of the process. If a separation of the bones had taken place, it is reasonable to infer that the space gained between the incisors should have been equal to that of the bicuspids."

Robert Hepburn, British Journal of Dental Science, 1862, in a lecture on *"The Correction of Irregularities of the Teeth by Mechanical Means,"* says:

"On the Mechanical Treatment of the Irregularities of the Teeth.—On the wide field of dental science there is no subject more interesting, none in which the knowledge of anatomy and surgery, combined with mechanical skill, is more required, none which depends so much on the judgment and patience of the operator for a successful result, and none where the lack of these requirements is so likely to produce serious and lasting injury to the patient.

"I have already said that many of the cases we daily meet with may be fairly attributed to neglect when young. I may now add that many others may be traced to maltreatment at the hands of inexperienced men, ignorant alike of the structure of the teeth, of the mechanical contrivances necessary for the correction of irregularities, as well as that anatomical knowledge so requisite to guide them in their timely and judicious use. It is an old and true adage that 'prevention is better than cure.' While superficial skill may in some instances enable you to effect a cure, I wish to impress this fact upon your minds, that a deeper knowledge will ensure that which is better still, viz., the prevention of the evil your skill might only chance to cure.

"The first and certainly most simple appliance used for regulating teeth was the ligature of thread, which was subsequently changed for gold wire, finely drawn and very soft. With these ligatures it was intended to draw the irregular teeth into their normal position, by interlacing and binding them to the stronger and more regular ones.

"In the construction of these appliances there are several requirements, which, if not absolutely essential to their success, nevertheless materially assist in securing it. The first of these is simplicity of form and action. We may construct a most complicated piece of mechanism, of delicate workmanship, highly finished, beautifully articulated, and altogether looking exceedingly pretty on the model, every little spring having its own particular action, and every little plug its duty to perform. When placed in the mouth, however, the slightest movement turns every little spring and plug out of place, all the nice adaptations being thrown to the winds, while the instrument itself is wholly unfit to stand the wear and tear of mastication, etc. Do not allow yourselves to be carried away by fanciful pieces of work, which in theory and on a model look well, but are unfitted for all practical purposes in the mouth. Let your aim be to secure simplicity of form and directness of action, as essential characteristics of a good regulating piece.

"Next we have fixedness, or the capability of being steadily secured in place in the mouth. If the piece can not be made to retain its position, our efforts to secure simplicity of form and direct action will be in vain."

H. Meredith White, in the *Dental Cosmos,* June, 1862, page 578, on *"A Case of Irregularity of the Teeth,"* says:

"The following case of irregularity presented in April, 1859. The patient was in his twentieth year, and in good health:

"The right superior lateral incisor stood entirely within the arch of the lower jaw. The left superior lateral struck upon parts of the left inferior median and lateral incisors, and, by the constant friction to which it was exposed, had been so much worn on the cutting edge that the dentine could be seen between the anterior and posterior plates of the enamel—on this account it was shorter than the lateral of the right side.

"The arch of the upper jaw was nearly as small as that of the lower, and the spaces that the laterals should have occupied were but half sufficient for their accommodation.

"In regulating these teeth, two things were to be accomplished: (1st) To enlarge the arch. (2nd) To place the irregular teeth in their proper places. These two steps were accomplished at the same time. As the labial surfaces of the laterals were somewhat round, resembling canine teeth, it was evident that by forcing the teeth forward they would act as wedges, and widen the arch, and at the same time would gain their proper places. By the aid of inclined planes, one for each lateral adapted to a plate fitting the under jaw, this was gained. In addition to this a plate was made for the upper jaw, having crib-bands for the first and second bicuspids of each side, and a bar to run around in front of the upper arch, standing away from the labial surfaces of the teeth about an eighth of an inch, and soldered to the crib-bands; patent thread ligatures were secured to the necks of the laterals, and the ends drawn tightly around the bar and tied. These ligatures were renewed every three or four days so as to keep up a continual traction. The inclined planes were worn continually, thus making them powerful auxiliaries; in the mean time, by propping the teeth apart about a quarter of an inch, they allowed the laterals to slip over the lower teeth.

From time to time the bar of the upper plate was lengthened by placing it over the arm of a small anvil, and striking it with a small riveting hammer. This was done to make room for the teeth as they advanced. The central incisors were coming forward at the same time, and increasing the size of the arch.

"After pursuing this course for three months the teeth had arrived at their proper places. The inclined plane and the plate with the bar were now dispensed with; but now a new plate for the upper arch was made, with pieces fitting against the back parts of the four incisors, in order to prevent retrocession or turning of the teeth. This plate was worn nearly two months, so as to give the teeth sufficient time to become firm in their sockets. The plate was then left off, there being no further use for it. The teeth were regular, and looked very well; but the shortness of the left lateral, referred to above, was objectionable.

"I tied very tightly a patent thread ligature around the neck of the short tooth, and under the free margin of the gum. I saw the patient in three days, and observed that the tooth projected from its socket to a slight extent. The ligature was still retained, and the patient was seen again in three days. The tooth had already lengthened sufficiently; there was considerable irritation and some pain. The string was removed, and the patient directed not to use that side of the mouth for several days, and occasionally to apply a little pounded ice in a rag to the gum above the tooth, and to return in a week. The patient came as directed. All irritation had subsided, and the tooth had shortened, but not to its original state.

"By practicing this treatment every alternate week, so as to give the tooth time to recover each successive shock, the end was accomplished in six weeks. The tooth is as long as its fellow of the other side, and after having its rough edges dressed off, presented a good appearance.

"It has now been over two years since the affair was concluded, and so far no ill effect has arisen from this novel plan of lengthening teeth, which has been very successful in the hands of him whose advice I followed.

"It may be proper to add that during the first fifteen days of regulating teeth, by means of any apparatus, there is always more to fear than during the subsequent treatment, since violent periostitis is apt to occur, and if it does it is more difficult to treat, and more destructive in its consequences than apparently the same amount of inflammation occurring during the treatment of a case of irregularity that has been under way for a longer time."

THOSE WHO DESTROY AND THOSE WHO RECONSTITUTE

By Dr. Luis Subirana, Madrid, Spain.

Professor of Orthodontia in the School of Dentistry of the University of Madrid.

ORTHODONTIA, in Spain, as well as Europe, is in such a rudimentary state of development that the writer feels that, even though he reach an extremely old age, he would not see this splendid branch of medicine enjoy its due, social and scientific prestige, consideration and respect necessary for its physiological transcendency in all classes profane and medical, as well as dental. The indifference and ignorance in both classes is so great (it concerns the one because it is to derive the benefits of orthodontia, the other because it is to contribute to the attainment of this object, since the highest mission of the doctor and dentist is to care for the health of humanity) that numberless evils are produced. We say numberless, because we continue to think that the moral and intellectual qualities in man arise in the physical structure and we adjudge to the mouth the greatest vegetative importance for its organs, function and surroundings.

The clinic, the greatest teacher, affords us every day occasions to appreciate the rudimentary state in which orthodontia really is and what it signifies. Today it is the colleague who recommends "not to undertake the regulation until the child is perfectly developed." (These words are repeated so very frequently, that, of course, the professional ethics remain miserably mistreated.) Again, it is a doctor who orders a six-year molar extracted. The other day it was a father who permitted the mutilation and extraction of one or two of his son's teeth in order to have the teeth arranged in harmony.

The case here presented is highly instructive. The child was operated upon in a French town for some growth. In spite of the ablation, the child continued to breathe through the mouth for some months after. Following the advice of the rhinologist, the child was taken to a dentist in Paris and he proposed the correction of the dental range. For the first step he proposed and executed the extraction of the left lower lateral incisor. The following day he was to extract the upper lateral incisor on the same side, which is seen in infra-linguoversion (Fig. 7). The maternal instinct saw a blunder or error in what had been done and proposed by the dentist. Although the one tooth was gone, and no remedy possible, there was still time to save the other. New consultation with the rhinologist. . . .

The girl was eleven years old. She was nervous, extremely sensitive, dull and faint looking. She had a depressed thorax, slant neck, pale face, very thin generally, and had mouth breathing. In criticising the procedure, let us say, as Angle, according to his definition: "Orthodontia is a science, the object of which is to correct the malocclusion of the teeth," and without pretending to excel the great professor, we are going to amplify it, saying: "Orthodontia is that science which, defending the right of the dental system, contributes to the

Fig. 1.—Before correcting the dental range. Eleven years old. Mouth partially open. Generally slender. Face pale and inexpressive, without vivacity.

Fig. 2.—After the correction. General harmony of the movements of the face. The stimulus of the facial organs, through an efficient and intense mastication, is shown in the calmness and beauty of the face.

Fig. 3.—Before the correction.

Fig. 4.—After the correction.

harmonical development of the face, and of the organs integrating it, wholly and regularly assisting the functions of the mouth."

We do not pretend in this article nor at this time to advance a new definition, but simply to explain, and facilitate the comprehension of our successive arguments.

If what Angle and we say is true, and in fact it is, all men who, in order to correct the teeth extract them, continue to separate themselves from the

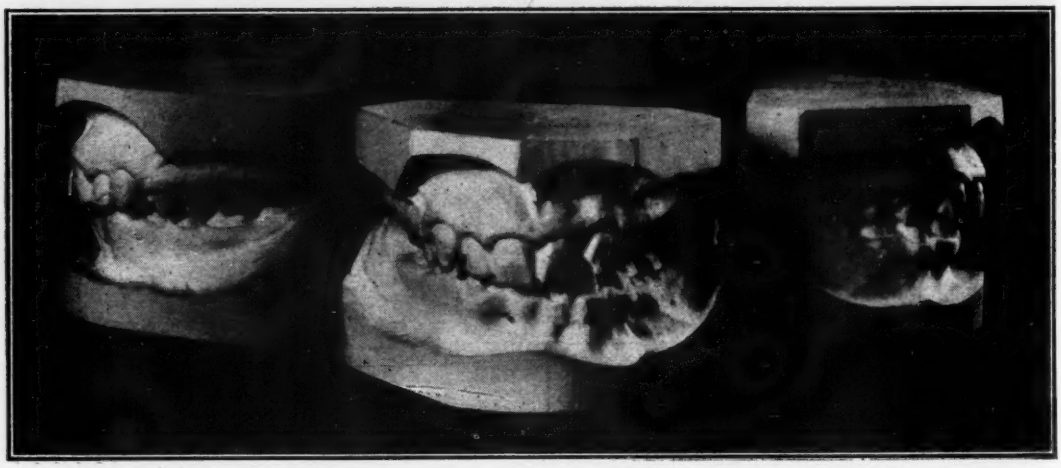

Fig. 5.—Model of the mouth before the correction. Notice that the central and left canines are intact. The lateral one is in the palatine arch.

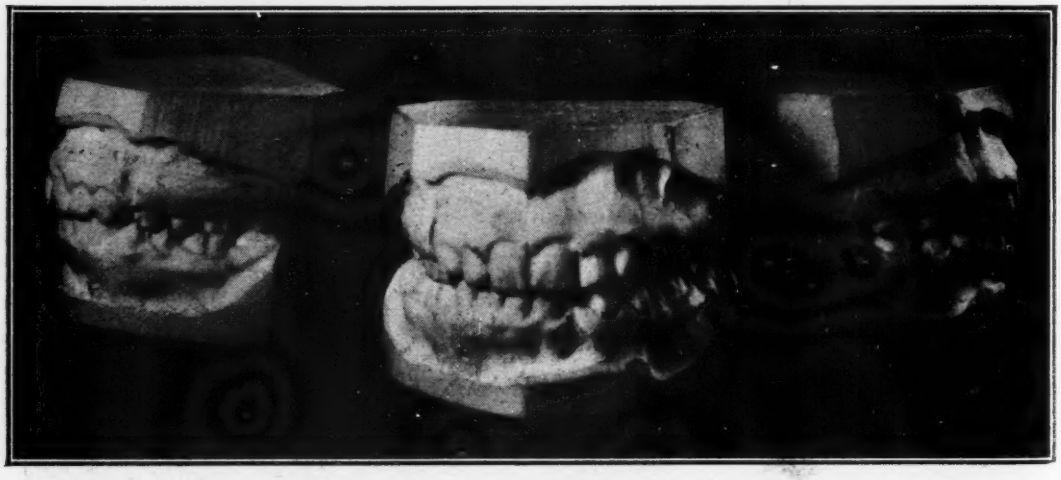

Fig. 6.—Models of the mouth after correction. The occlusion is perfect. The left superior lateral stands in a right line. In the model one may see the space obtained to secure the corresponding length of the arch; a space which will be occupied by a false tooth, rectifying the harm caused by the extraction.

noble aims of orthodontia the more they extract, because orthodontia is not that sum of operations, manipulations, opinions, and personal subjective thoughts, which have for their object the adjustment of a few stray teeth in the mouth. Orthodontia is something much more serious. It is something that does not permit personal interpretations. A malocclusion is not a disputable thing. Orthodontia has its canons, its laws. It is a regulated and measured thing, and he

who forget's nature's institutions goes directly against the aims of orthodontia.

In the philogenical regulation man has 32 teeth. The orthodontist's duty is to respect this sacred accommodation for the necessities of man. He who injures them, betrays this duty, more than that, he makes the first step of

Fig. 7.—Occlusal surface before the correction.

Fig. 8.—Occlusal surface after the correction.

[1] Let us compare the enlargement of the palatine and dental arches with their symmetry. In Fig. 7 one sees the lateral incisor in intraversion, rendering difficult phonation. In Fig. 8 it is seen in its anatomical position.

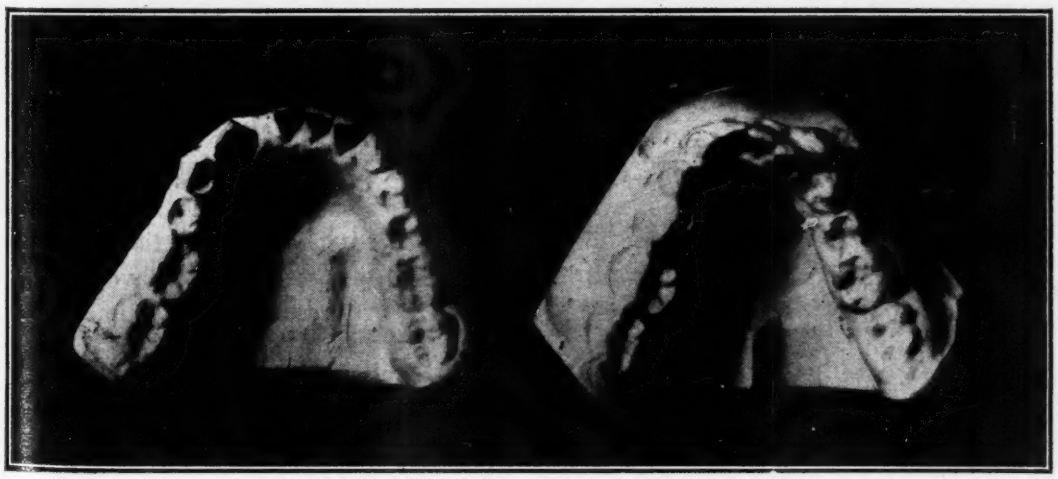

Fig. 9.—Occlusal surface after correction.

Fig. 10.—Occlusal surface before correction.

More than one centimeter of enlargement was secured which has afforded the tongue a "lodging" in proportion to its size. Fig. 9 shows the space secured for the lateral incisor.

individual degeneration, which, if continued during successive generations, will corrupt the species.

When a child, having a malocclusion, comes to our consultation to have

some dental relation corrected, he does not come to have the number of teeth corrected. *The orthodontist is the guider of deviations, not a surgeon to cure by maiming.*

The blood and wound should be proscribed to the orthodontist. The orthodontist is the orthopedist who, realizing the inestimable value of the living matter corrects, modifies and reinstates the functional integrality within the anatomical integrality. The numerical dental formula is a sacred collectivity that should merit the highest respect and honor because it represents a definite length by a sum of antero-posterior diameters; because it represents an adequate and proportional form of the arch with all of the organs which come in contact with it; because it represents, through the size, relation, and form, the exact, precise, and harmonical limit for the phonation, mechanics of digestion, the harmony of the facial lines, and the *maximum* functional excitation.

Now my old colleagues of controversy of the Odontological Society in the years 1899 and 1900 will understand the reason of our furious protest, predicted, rather than rational, when a person of authority pretended to present as the best therapeutical law, as the prophylactic panacea of I-don't-know-what, the extraction of the six year molar. Today would there be any heretic capable of rising to defend such a theory?

What would we say of a doctor, who, upon having a child, with a deformed leg come to him, would order the leg amputated instead of prescribing reconstituents and orthopedic therapeutics. It is the same case.

A malocclusion is neither an illness nor a wound; it is an anomaly. It is a perversion of a union of the organs in geometrical solidarity. It is a system accidentally out of order, and its normal state must not be secured by the suppression of one of its elements, factors or its unities.

Therefore, our method of procedure was contrary to the former one. It was necessary to preserve the superior lateral. It was also necessary to enlarge, to space the lower teeth, and to obtain a space of equal diameter to the extracted lower tooth, in order to insert a false one. Without this requisite, orthodontia would not be possible. Only with orthodontia could "normal occlusion" be obtained the basis of coordination and correlation, and anatomical harmony of all the muscles and bones that are below its statical and dynamic dependency. We do not pretend to speak of the technic followed in this correction and of the other considerations, which will be given the proper space. We have simply endeavored to show with this case the necessity of preserving the number of teeth, a point so essential in orthodontia.

STEREOSCOPIC PHOTOGRAPHS AS ORTHODONTIC RECORDS

By H. C. Pollock, D.D.S., St. Louis, Mo.

STEREOSCOPIC photography is not a new art, in fact, it is a very old principle applied to photography. However, it has only recently been applied to x-ray records of the examination of anatomical specimens.

The use of this type of photography may prove of interest to many orthodontists, as to the author it has been a source of considerable satisfaction and interest.

This type of photographic record is more complete, thorough, and satisfactory from an orthodontic standpoint because the object is seen in perspective relief. In the ordinary vision the respective images of an object formed upon the retinas of the two eyes differ slightly, due to the divergence of the rays from each point of the object, but the effect upon the brain is that of a single object seen in perspective relief. The monocular image lacks this effect. Observed through the stereoscope, two pictures, taken under a slight difference of angular view, are seen side by side, each eye looking upon one picture only; thus, as in ordinary vision, two images are conveyed to the brain where they are united into one, exhibiting the objects represented under a high degree of relief.

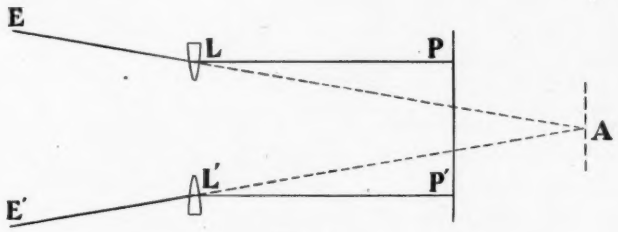

Fig. 1.

The principle employed is based upon the refractive properties of a semi-double convex lense. The action may be illustrated by diagram (Fig. 1). The light rays from corresponding points of the two pictures (P and P′) are refracted in passing through the lenses (L and L′), and their directions changed so that they now seem to the eyes (E and E′) to diverge from a common point (A) beyond the plane of the card. By special effort a skilled observer can combine stereoscopic pictures into one without the use of the instrument, each eye being directed to one picture only, and, to produce the stereoscopic effect, the one on its own side. The process may be facilitated by interposing a card screen between the pictures, so that, for example, the left picture will be entirely cut off from the right eye. If the eyes are crossed so that the right eye sees the left picture and the left eye, the right picture only, and the images combine by special effort, the usual stereoscopic effect is reversed, a convex surface becomes concave, etc.

In order to get the stereoscopic effect of the accompanying photographs, it will be necessary to cut the picture out of the Journal at the edge of the heavy black line, and place it in any ordinary old-fashioned stereoscope, as shown in Fig. 2.

Fig. 3 furnishes a beautiful record of a typical tongue habit, causing the protrusion of the upper anterior teeth. This picture, when seen through the stereoscope, shows very plainly the tongue resting against the lingual surfaces of the upper anterior teeth and slightly protruding between the upper and lower teeth as a result of the pressure behind it.

Fig. 4 shows the record of a case of fatty frenum. It will be observed by placing this picture in the stereoscope that the anatomy is almost as well shown as in the patient's mouth direct.

Figs. 5 and 6 show other records of various types of malocclusion which

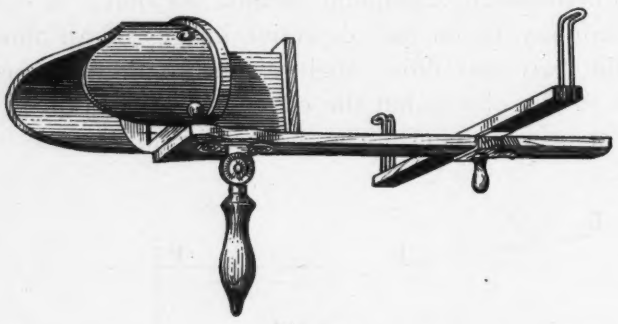

Fig. 2.

make very interesting studies to refer to while the case is under active treatment.

Fig. 7 shows the possibilities of photographing the interior of the mouth. By careful and painstaking technic the occlusion of the teeth may be photographed as far back as the second molar.

The author is deeply indebted to Dr. C. A. Vosburgh, of St. Louis, whose vast experience in the photography of the wild animal life of New Brunswick, stereoscopically, has enabled him to develop the proper technic very rapidly. Having once attained this skill, it becomes only a matter of a few minutes to take these pictures at the chair.

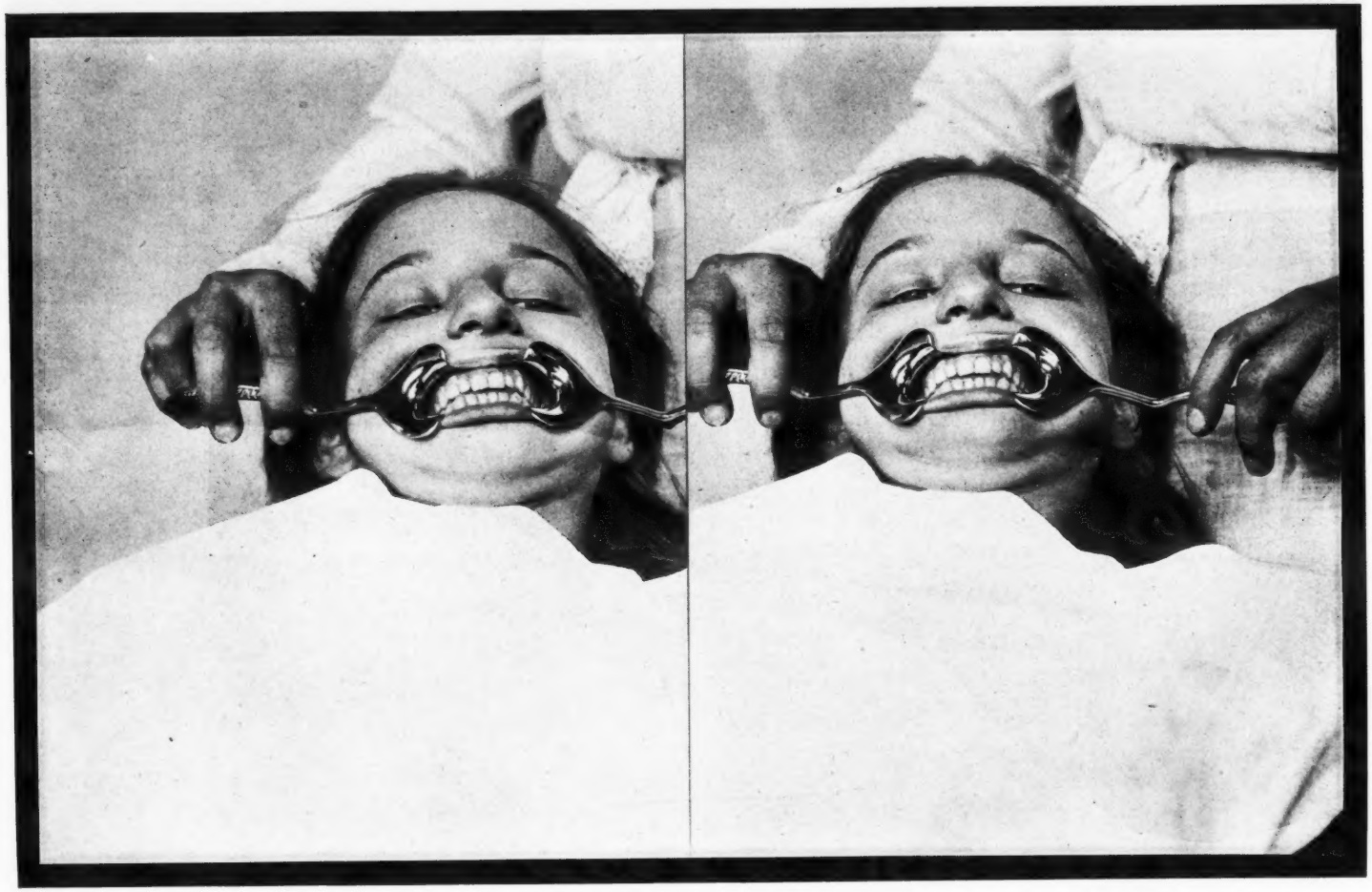

Fig. 3.

Fig. 4.

Fig. 5.

UNIV. OF MICH.

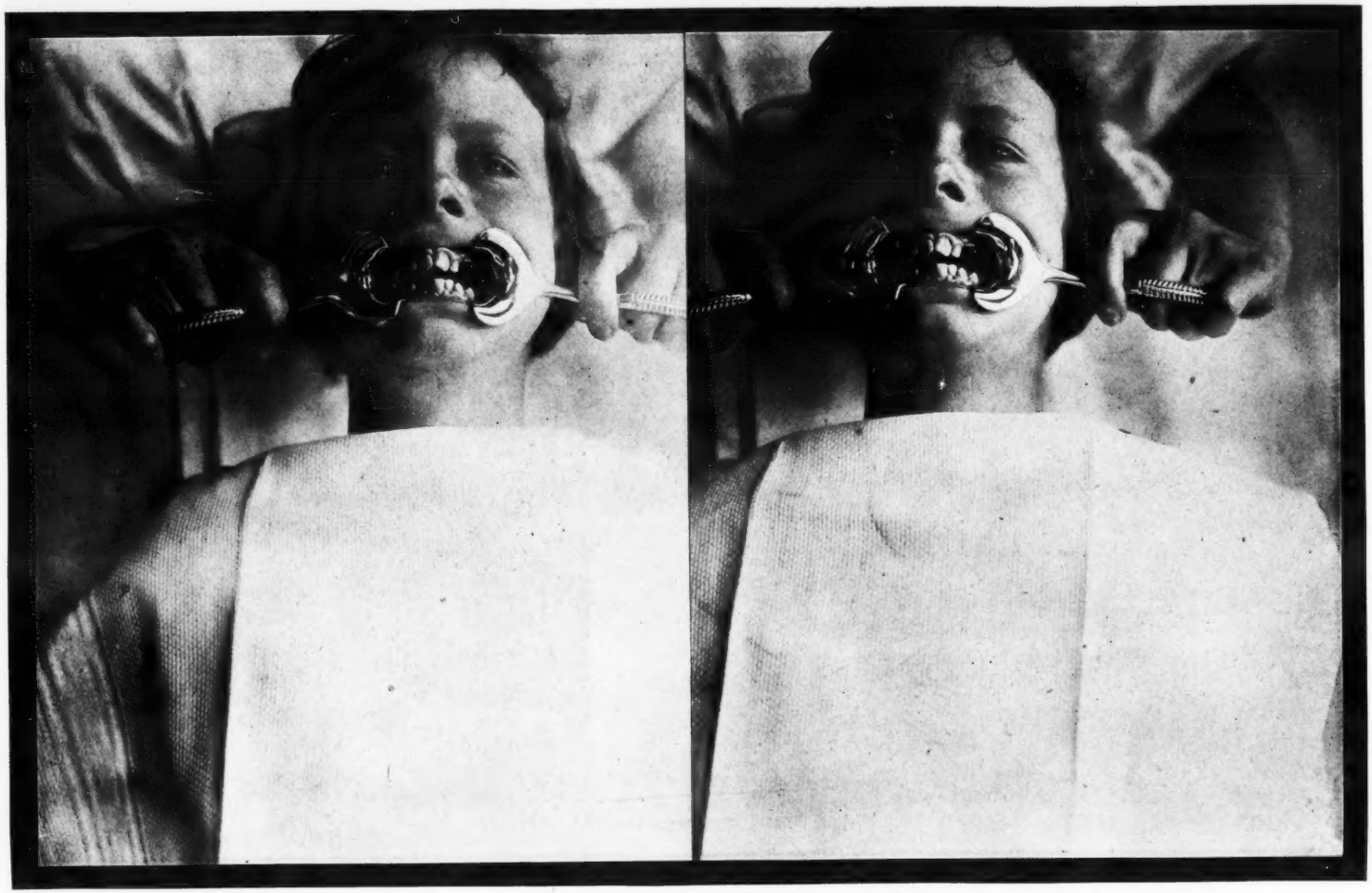

Fig. 6.

Fig. 7.

UNIV. OF MICH.

DEPARTMENT OF
DENTAL AND ORAL RADIOGRAPHY

JAMES DAVID MCCOY, D.D.S., EDITOR
LOS ANGELES, CALIF.

INDICATIONS FOR THE USE OF THE X-RAY IN ORTHODONTIA

BY JAMES DAVID MCCOY, D.D.S., LOS ANGELES, CALIF.
Professor of Orthodontia and Radiography, College of Dentistry, University of Southern California.

IT is no longer necessary to present an argument in favor of the use of the x-ray in any of the various branches of dentistry, as its merits and possibilities are now recognized by all openminded and progressive members of the dental profession.

Orthodontists were among the first in the profession to recognize the valuable aid to be gained through the adoption of this agent as a regular part of office routine, and as a result, many of the uncertainties and perplexing situations incident to orthodontic practice have been clarified.

That the orthodontist should maintain his own x-ray laboratory is no longer a debatable point. With it he is able to utilize the x-ray whenever the necessity for its use arises, without subjecting patients or himself to the inconvenience or added expense incident to referring them to a roentgenologist; and what is even more important, *with it conveniently at hand, he will use it whenever indicated, instead of limiting its use to cases of dire necessity.*

It is only logical, therefore, to assume that *an essential part of the preparation of the student or practitioner, who is to undertake Orthodontic procedures, will include the basic principles of radiography,* which entails a knowledge of the nature of the x-ray, the electrophysics of its production, the intelligent handling of x-ray apparatus, the technic of radiography, the development of plates and films, the interpretation of radiographs, as well as a knowledge of the dangers arising through the misuse of the x-ray.

Taking it for granted that the reader is thus prepared, it will, therefore, be unnecessary to discuss here any phases of the above enumerated principles, other than touching upon a few practical suggestions in technic of special significance to the orthodontist.

Owing to the fact that patients undergoing orthodontic treatment are usually children whose ages necessitate their being handled with tact and gentleness if confidence is maintained, precaution should be taken to rid every operation of fear

or discomfort. Especially is this essential in making radiographs, for any considerable degree of movement on the part of a patient will either curtail the value of the finished radiograph, or perhaps render it useless.

THE QUESTION OF TECHNIC.

To obtain a radiograph of any portion of the body, it is necessary to have a photographic or x-ray plate or film (properly prepared so as to exclude all light and moisture) placed in such a position that the x-rays may pass through the desired structures and register their shadows with the least amount of distortion possible upon the plate or film.

In securing radiographs of the dental and oral structures, two general methods of procedure are open to us, each of which has its value and special indications. These are known as the "intra-oral" and "extra-oral" methods.

With the first named, small films are used, which are placed within the mouth opposite the area to be radiographed, and held in position either by means of a film holder, or by the assistant, or better still, by the patient exerting slight pressure with the finger. *This method is indicated when radiographs of small areas only are desired; as, for instance, two or three teeth, with the adjacent alveolar process.*

With the other method of procedure mentioned, namely, the extra-oral method, large plates or films are used, and the areas desired are brought in as close contact as possible with the plate, by pressing or resting the side or portion of the face in which the structures are located against it. The rays are then passed through the structures from the other side of the skull, in such a manner as to cause the shadows of the desired structures to be imposed upon the plate. By using this method, large areas may be radiographed, which in some instances, will embrace the lateral half of both the upper and lower jaws from the region of the lateral incisors anteriorly to the angle of the jaws posteriorly, and from the floor of the orbit above to the inferior margin of the mandible below. In fact, it is possible, by making several exposures, to obtain in detail a radiographic representation of the dental apparatus in toto, as well as its associated organs and structures, the nasal cavity, pneumatic sinuses, the maxilla and mandible.

In selecting a method of procedure for making radiographs of children, the child's comfort must be taken into consideration, and with this idea in mind, the author has found it an advantage to use the extra-oral method quite universally. In fact, he has used it in nearly all cases except where the region embracing the upper anterior teeth is under scrutiny. The wisdom of this course will be apparent to anyone who has experienced the discomfort of having intra-oral films placed lingually to the lower teeth, where the tissues are very sensitive, or has had them placed back in the molar region, against the palate, where they so frequently induce gagging. These unpleasant features are all eliminated by using the extra-oral method, and good radiographs of the structures desired can be secured on the larger plates. This statement should not be construed as a protest against the use of intra-oral films in dental radiography, for it is very often necessary to use such films with adult patients where a high degree of detail is essential, in determining the condition about nonvital teeth, root canal fillings, etc. In orthodontic practice, however, where we are dealing with young

subjects entirely, a sufficient degree of detail can be obtained in the majority of instances, using the extra-oral method to satisfy the needs of the operator.

SEATING THE PATIENT.

In preparing the patient to be radiographed, it is important that a suitable chair be provided, which will afford ample support, not only for the head, but will make it possible for the patient to be sufficiently comfortable to remain quiet, without difficulty. For this purpose, the dental chair may be used, or if this is not convenient to the x-ray apparatus, the ordinary armchair with a headrest may be utilized. The author has found it an advantage to use the ordinary chair with a straight back and small arms, placed against the back of the dental chair. (See Fig. 1.) The headrest of the dental chair is turned over and adjusted to the proper height, position and angle to support the

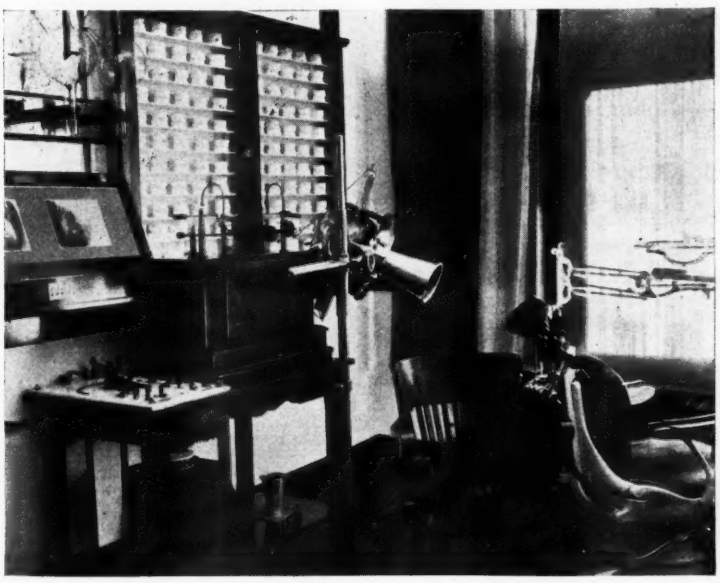

Fig. 1.—Showing the manner of arranging a chair for seating the patient, and providing a support for the head. Where the "extra-oral" method is being used the headrest wings serve as a plate-rest.

patient's head. If the extra-oral method is being utilized, the headrest wings are flattened out to make a resting place for the plate. In this way, the patient's head is afforded the firm support of the heavy dental chair, and the plate is held in an immobile state without difficulty, and the operator can, by making a few changes in the position of the small chair, and by moving and readjusting the headrest, have radiographic access to any part of the dental structures. (See Figs. 2, 3, 4, 5, and 6.) The fact that this requires but a few moments, does not disarrange the office, or put the patient to discomfort, justifies the author in feeling that it is an excellent method for use in the dental office. Of course, it is necessary where this method is followed, to have the x-ray machine and accessory apparatus in the same room with the dental chair. Where this is not possible, it is an easy matter to attach an adjustable headrest to the ordinary straight-back chair, and by having the patient change positions in the chair, accomplish the same result.

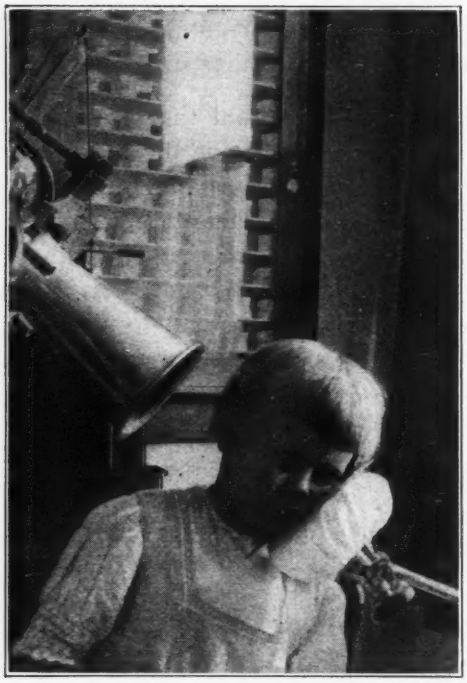

Fig. 2.—The patient is seated and the apparatus arranged to make a radiograph of the left side. Fig. 3 shows the extent of the radiograph made by this technic.

Fig. 3.—Radiograph made by utilizing the technic shown in Fig. 2. The radiograph reveals the fact that the bicuspids and permanent cuspids on the left side are present, but that there is a congenital absence of permanent molars.

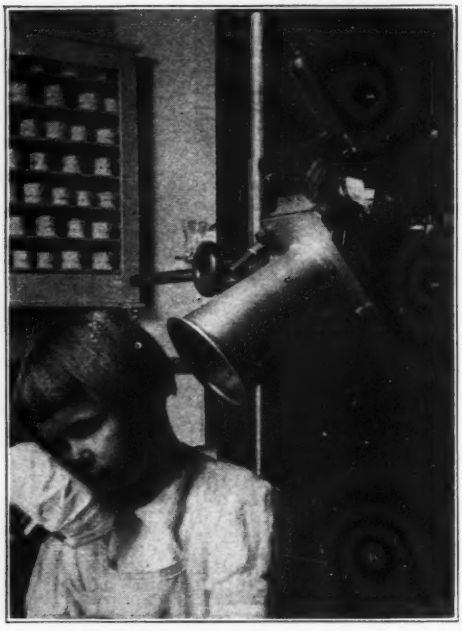

Fig. 4.—The patient is seated and the apparatus is arranged to make a radiograph of the right side. Fig. 5 shows the extent of the radiograph made by this technic.

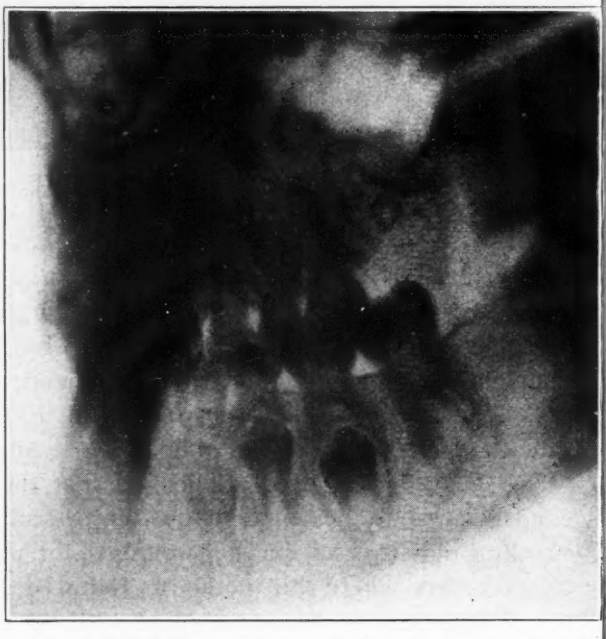

Fig. 5.—Radiograph made by utilizing the technic shown in Fig. 4. The radiograph reveals the fact that the bicuspids and permanent cuspids on the right side are present, but that there is a congenital absence of all the permanent molars except the lower first.

INDICATIONS FOR THE USE OF THE X-RAY BY THE ORTHODONTIST.

The necessity for using the x-ray in orthodontic practice, varies with different patients, but generally speaking, may be summarized under ten different headings as follows:

1. *As a means of determining the presence or absence of unerupted permanent teeth before treatment is started.*

The majority of patients requiring orthodontic treatment usually have a mixed dentition; that is, they usually have present in the mouth, the deciduous molars and cuspids. It is essential, therefore, to determine whether or not these deciduous teeth all have permanent successors. If the upper and lower incisors have erupted, information concerning the other permanent teeth is easily obtained, by making a radiograph of each side by the extra-oral method. Such radiographs are shown in Figs. 3 and 5.

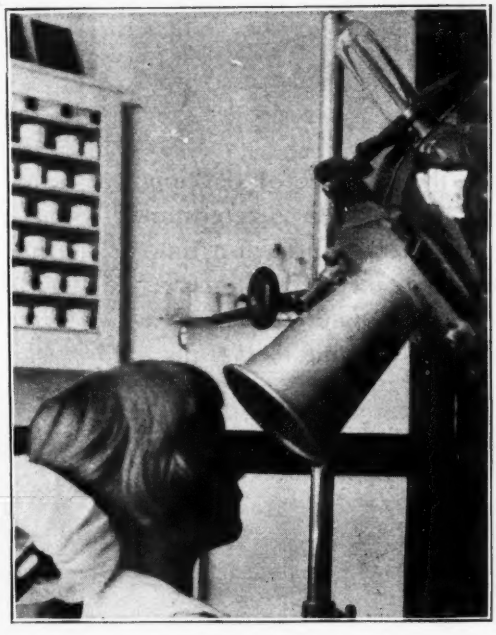

Fig. 6.—Where "intra-oral" radiographs are desired, the headrest is arranged so as to support the patient's head.

Such radiographs give the operator a very adequate survey of these unerupted teeth, and leave no doubt as to their presence or absence.

2. *As a means of determining the approximate size of unerupted teeth, for which space must be made in the arches.*

Where the deciduous molars or cuspids have been lost prematurely, with the usual resultant loss of space in the arch involved, the radiograph can be made to show quite accurately the amount of space which it will be necessary to establish, if adequate space is to be prepared for the unerupted teeth. (See Figs. 7, 8, and 9.)

3. *To determine the state of development of unerupted teeth which are tardy in their eruption.*

Not infrequently permanent teeth fail to come through when expected. By

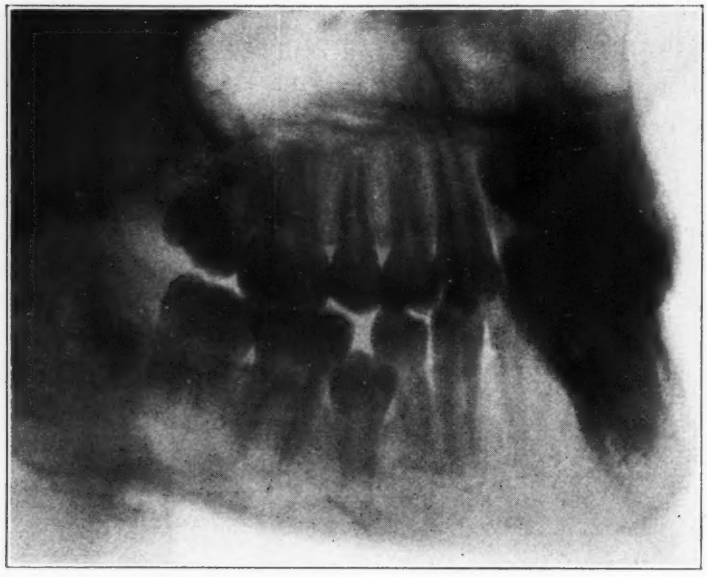

Fig. 7.—Unerupted lower second bicuspid for which room must be made to permit its eruption.

utilizing the radiograph, their degree of development is easily determined, and often the cause for their noneruption is determined. Steps can then be taken to open up spaces, and hold them until such a time as the teeth involved progress in their development to the point of eruption. (See Fig. 10.)

4. *To determine the approximate direction in which teeth are erupting, and the relationship which they will have to the line of occlusion when erupted.*

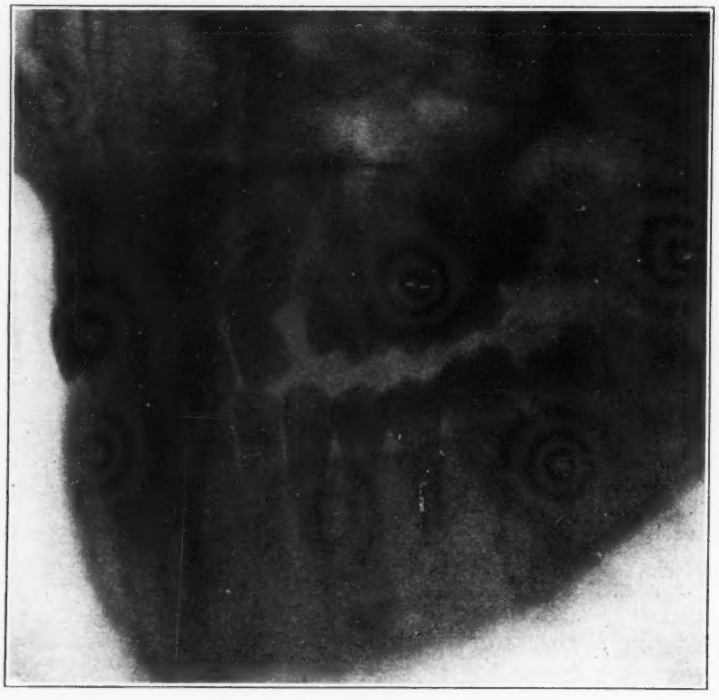

Fig. 8.—Unerupted upper cuspid for which space must be made if it is to erupt in its normal position.

Fig. 9.—Unerupted lower lateral incisor for which space must be made.

Fig. 10.—Unerupted lower second molar which is prevented from erupting through impaction against the lower first molar.

Where the deciduous teeth have been retained in the mouth longer than their normal period, and where the roots of these teeth have not been entirely absorbed, the erupting permanent teeth will sometimes be deflected out of their normal course. It is an advantage to know the direction in which they are deflected, so that if retaining appliances are to be placed, they may be arranged in such a way, and in such a relationship to the erupting teeth that they will not interfere with them. In fact, it is sometimes possible to construct the retainer in such a way that the tooth which is deflected out of its

Fig. 11.—Unerupted upper bicuspid teeth which are being deflected to the lingual.

Fig. 12.—Unerupted upper cuspid to which an attachment has been secured to effect its eruption.

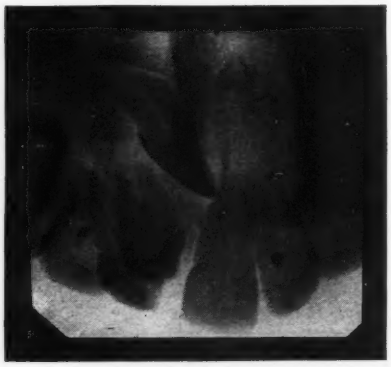

Fig. 13 *A*.

Fig. 13 *B*.

Fig. 13 *A* and *B*.—Two supernumerary central incisors are shown in *A* with the normal central lying above them. *B* shows the same case after the extraction of the supernumerary teeth. An attachment has been secured to the central preparatory to moving it down into place. The patient is fourteen years of age.

course may be guided towards its normal position, or moved there before the inclined planes of the opposing teeth become a factor in establishing it entirely out of its normal position. (See Fig. 11.)

5. *As a guide where it is necessary to make attachments to unerupted teeth, to aid in their eruption.*

While it is not often necessary to secure attachments to teeth lying beneath the gingival tissues, the occasion for this sometimes arises, as shown in Figs. 12 and 13. In such cases, radiographs should be made as a guide in securing the

Fig. 14.—Unerupted lower second bicuspid in a patient twelve years of age.

attachment. After the attachment is secured, others should be made to determine the direction in which force should be applied to accomplish the desired tooth movement.

6. *To determine the most opportune time for the extraction of the deciduous teeth.*

Fig 15.—Unerupted upper second bicuspid retarded in its eruption by the presence of the deciduous second molar.

Where the deciduous tooth persists in the mouth, and shows no sign of being shed, it is an advantage to determine the extent of absorption of the roots, as well as the development of its successor, so that if extraction is resorted to, it can be done with the knowledge that the developing tooth will not be disturbed or injured, and that the successor has reached a degree of development which will insure its eruption within a reasonable time. (See Figs. 14 to 15.)

7. *To observe the movement of the roots of teeth and their relationship to other roots and structures.*

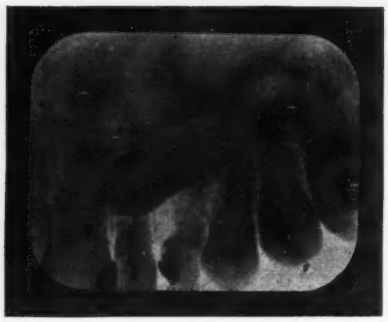

Fig. 16 *A*.

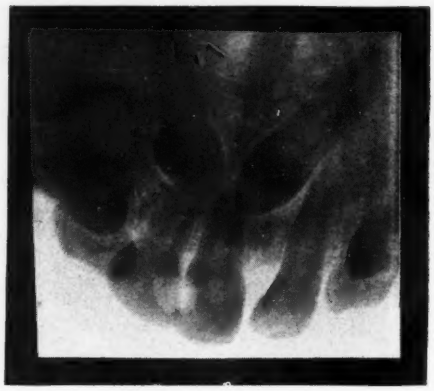

Fig. 16 *B*.

Fig. 16 *C*.

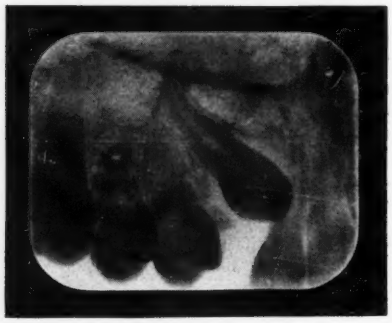

Fig. 16 *D*.

Fig. 16 *A*, *B*, *C*, and *D*.—Unerupted cuspid teeth whose relationship to the roots of the incisors must be taken into consideration during tooth movement.

In the bodily movement of teeth, and particularly of the incisors, it is important in young subjects that these roots do not encroach upon each other or upon other teeth; for instance, an unerupted cuspid. It is, therefore, advisable, where any doubt exists, to determine the exact status of this relationship. (See Fig. 16, A, B, C, and D.)

8. *To determine the relationship of developing third molars to certain recurrent malocclusions, and also as a precaution so that steps may be taken to prevent these teeth from becoming a cause of malocclusion during their eruption.*

The pressure exerted by developing lower third molars is often sufficiently

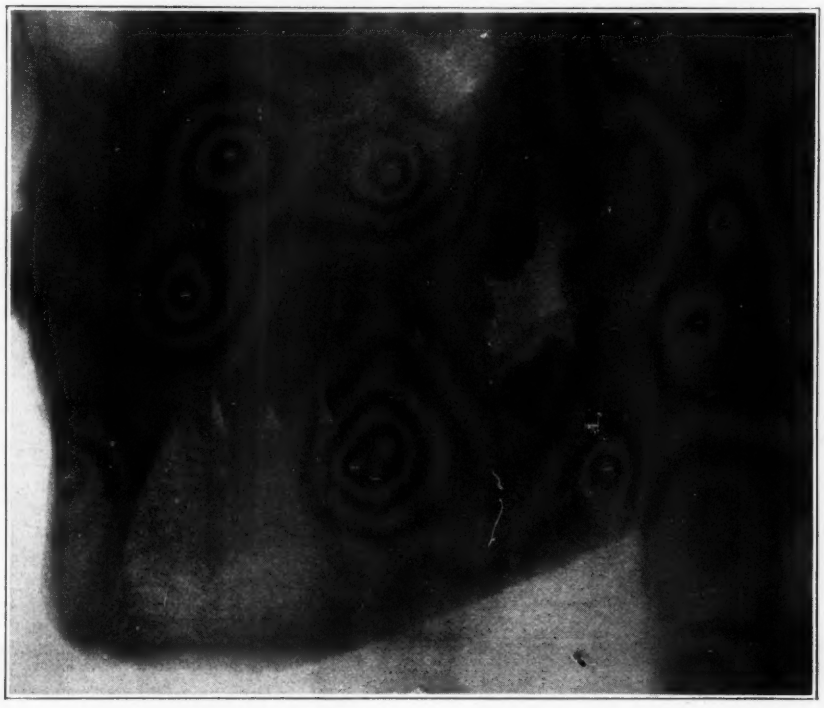

Fig. 17.—An unerupted lower third molar which is crowding the lower incisors.

Fig. 18.—An erupting lower third molar which has been responsible for the crowding of the lower incisors and cuspids.

great to cause a crowding of the lower incisors and cuspids. (See Figs. 17 and 18). This can be true, even though malocclusion has not existed in this region previous to the development of the third molars. By making radiographs from time to time, of those patients who are of an age for development and erupting these teeth, the status of the developing teeth can be determined and the necessary precautions taken to prevent the crowding of the incisors and cuspids.

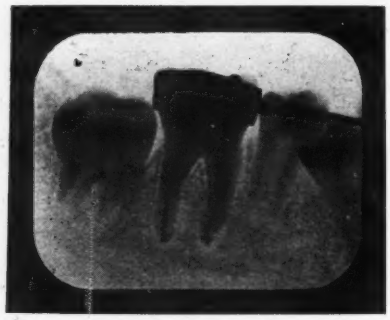

Fig. 19.—A nonvital tooth which is being used as an anchor tooth. The radiograph shows the root canals to be thoroughly filled.

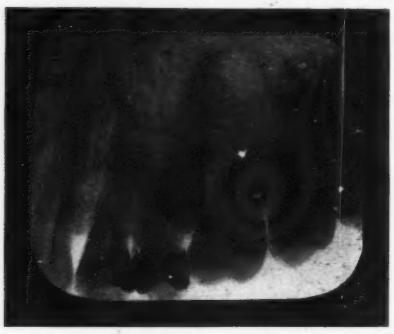

Fig. 20.—Supernumerary upper second bicuspid. Upon the extraction of the supernumerary, the normal tooth erupted.

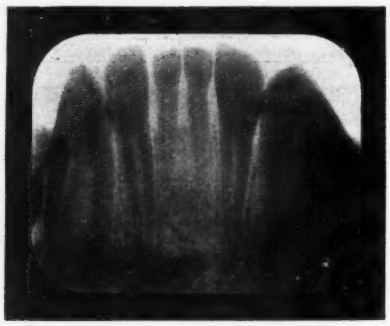

Fig. 21.—Lower deciduous central incisors having the appearance of supernumerary teeth. The radiograph leaves no doubt as to their identity, and also shows that these teeth have no permanent successors.

9. *To observe nonvital teeth prior to tooth movement, to determine their fitness for movement or anchorage, and their state of health during the process of orthodontic treatment.*

Where it is necessary to either move non-vital teeth, or utilize them as anchorage, it is essential to the patient's welfare and comfort to know that such teeth and their investing tissues are in a healthy condition. By determining this prior to instituting orthodontic treatment, much trouble both to the patient and operator can often be avoided. (See Fig. 19.)

10. *In cases where anomalous teeth are present, to differentiate between anomalous and normal teeth.*

In a majority of instances, this can be done without the aid of the radiograph, unless the teeth in question have failed to erupt. Under such conditions, by utilizing accuracy in the technic of making the radiographs, little difficulty is encountered in determining the difference between normal and anomalous teeth. (Examples are shown in Fig. 13 A, and in Figs. 20, and 21.)

The International Journal of Orthodontia

PUBLISHED THE FIFTEENTH OF EVERY MONTH BY

THE C. V. MOSBY CO., 801-807 Metropolitan Bldg., St. Louis, Mo.

Foreign Depots—*Great Britain*—Henry Kimpton, 263 High Holborn, London, W. C.; *Australasia*—Stirling & Co., 317 Collins Street, Modern Chambers, Melbourne; *India*—"Practical Medicine," Egerton Street, Delhi; *Porto Rico*—Pedro C. Timothee, Rafael Cordero 68, San Juan, P. R.

Subscription Rates—Single Copies, 30 cents. To anywhere in United States, Cuba, Porto Rico, Canal Zone, Mexico, Hawaii and Philippine Islands, $3.00 per year in advance. Under foreign postage, $3.40. English price: 15/ per annum, 1/6 per number. Volume begins with January and ends with December of each year.

Remittances—Remittances for subscriptions should be made by check, draft, postoffice or express money order, or registered letter, payable to the publishers, The C. V. Mosby Company.

Contributions—The editor will be pleased to consider the publication of original communications of merit on orthodontic and allied subjects, which must be contributed solely to this journal.

Opinions—Neither the editor nor the publisher hold themselves responsible for the opinions of contributors, nor are they responsible for other than editorial statements.

Reprints—Since it is not desirable to hold type standing longer than absolutely necessary, all requests for reprints should be made at time of submitting manuscript for publication. Rate card will be sent with galley proof.

Communications—Contributed articles, illustrations, letters, books for review, and all other matter pertaining to the editorial department should be addressed to the Editor, Doctor Martin Dewey, 25 East Washington Street, Chicago, Ill. All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 801-807 Metropolitan Building, St. Louis, Mo.

Illustrations—Such halftones and zinc etchings as in the judgment of the editor are necessary to illustrate articles will be furnished when photographs or drawings are supplied by the authors of said articles.

Advertisements—Objectionable advertisements will not be accepted for publication in this journal. Forms close first of month preceding date of issue. Advertising rates and sizes on application.

Change of Address—The publishers should be advised of change of subscriber's address about fifteen days before date of issue, with both new and old addresses given.

Nonreceipt of Copies—Complaints for nonreceipt of copies or requests for extra numbers must be received on or before the fifteenth of the month of publication; otherwise the supply is apt to be exhausted.

Entered at the Post Office at St. Louis, Mo., as Second-Class Matter

EDITORIALS

Our Friend, the Toothbrush

WE have often heard the statement: "Save us from our friends, we can look out for our enemies." If the toothbrush were able to state its own case today, I am sure it would make a similar statement. Reading the articles which have been published in the various dental journals for some time past we find that the toothbrush has received a large amount of criticism from a great many critics. It has been accused of being everything from the saviour of the teeth, to the enemy of the gum tissue; but, let it be as it may, the toothbrush seems to be going on and holding its own.

Several years ago when the oral prophylaxis propaganda was gaining headway, toothbrush drills at school and in private homes were advocated as the proper method of teaching children oral hygiene. As a result of the establishment of these toothbrush drills and the education children receive in public schools as to

the necessity of brushing the teeth, we find a great many humorous incidents arising, for instance, the story of the little Italian girl who went to school one morning without having her teeth brushed and the teacher inquired as to the reason for such condition. She informed the teacher that she could not use the toothbrush that morning because her mother was using it to clean carrots.

Upon this one recommendation alone we must admit that the toothbrush has a very important place in human economy, because any instrument or tool which has more than one use certainly is a valuable addition to civilization. If oral prophylaxis specialists are willing to let the toothbrush alone, there is no doubt but that it would serve a very useful purpose and it is a question in our minds as to whether anybody could do a great amount of harm with a toothbrush because the important thing seems to be to use it regardless of how you use it.

In referring to the matter of using a toothbrush regardless of how you use it recalls the condition which arose between two gentlemen who were occupying the same stateroom on a ship. Both of them believed in oral prophylaxis, both of them believed in brushing their teeth and it seems that there was but one toothbrush between the two. The owner of the toothbrush was not very fond of having the other individual use it. In other words, he was not a believer in the community toothbrush. As a result of this the non-owner of the toothbrush arose early one morning supposing he would use the toothbrush before the other gentleman was awake, but in the midst of the oral prophylaxis performance the owner of the toothbrush awoke and saw what was occurring. As soon as the gentleman was through with the toothbrush, the owner, without saying anything, proceeded to get up out of bed, using the toothbrush for the purpose of cleaning his toenails. The psychologic effect of the act in using the toothbrush as a manicuring brush upon the toenails had a very decided effect on the individual who first used the brush, and he decided that oral prophylaxis was not what it was supposed to be. Therefore, in our minds, if the toothbrush is used as it is intended to be used, and if the teeth are brushed with it whether they are brushed up and down, bucco-lingually, mesio-distally, occluso-gingivally, crosswise or rotary, backward and forward or sideways, in using a sufficient amount of water to irrigate the oral cavity, a certain amount of good is going to be accomplished.

The trouble seems to be with a great many friends of the toothbrush, a great many of the advocates of oral prophylaxis are not content to let a brush be a brush but are trying to make something else out of it. As a result of this, we have concave and convex brushes; we have brushes with bristles which are bleached and unbleached; we have men who advocate soft bristles and those who advocate hard bristles; we have those who advocate four rows of bristles and those who advocate one row of bristles; we have those who advocate right handed brushes and left handed brushes, circular brushes, square brushes, and fountain brushes. Every conceivable kind of a brush that is believed possible to be designed has been designed. If we knew of any possible way of manufacturing a toothbrush, any possible shape that it has not been manufactured in, any possible style of bristle that has not been used, we would immediately design that brush and following the plans of some men would advocate that it is the only brush that should be used and it will be the salvation of the oral cavity, the teeth, and humanity as a whole!

With due respect to the opinion of the men who claim the toothbrush is a

detriment to the gum tissue, who claim that the toothbrush will never prevent decay of the teeth or inflammation of the tissues around the teeth, who claim that a toothbrush should never be used; in our observation no part of the oral prophylaxis propaganda is ever going to do as much good as the simple, plain old toothbrush. Also in observing the "game of oral prophylaxis from the side lines" we do not see any one of the players including the toothbrush, the toothpick, the mouth wash, the tooth powder, the tooth paste, or any of the large number of implements entering into the oral prophylaxis game that is carrying the ball any further or hitting the line any harder than the toothbrush. Therefore, in our opinion, the thing to do is to let a toothbrush remain a toothbrush, not try to make a safety razor or a fountain syringe out of it; and if the use of the toothbrush can be instilled into children, we believe that it does not make so much difference how they use it, if they only will use it. Therefore, until something better is devised, we are willing to give the toothbrush its credit whether it is antiseptic or unantiseptic, whether it contains microorganisms or no microorganisms, we still believe it is capable of accomplishing great good in the economy of the human race.

The Politician in Scientific Societies

PROGRESS in science is accelerated by the organization and work of scientific bodies, but in this as in everything else in the universe, there are two sides to the shield. Organization of scientific societies has brought into such sciences the politician, and much of the usefulness of such societies is counteracted by the baneful influence exerted upon them by this individual.

Usually scientific men care little for politics. They are engrossed with their work. They are busy seeking out new discoveries in their respective fields and in keeping the wolf from the door. Their ideals are high, and their motives clean. They attend the meetings of their society when it is possible for them to do so, keep up their dues, and read the official organ of their society—if they are fortunate enough to have one.

Such conditions make fruitful ground for the politician. He is usually a man of mediocre scientific attainments. He may have degrees conferred upon him by admiring, but second grade, universities; but so far as adding to the sum total of human knowledge by any original investigation, or special work, or in advancing science in any manner—this he never does. Usually such an individual is a good entertainer, and to the unsophisticated, is a royal good fellow. In medical and dental societies such an individual usually practices a specialty. The reason for doing this is obvious. When papers are read, he discusses them, such discussions usually being uninteresting and shallow; but discussions are popular and bring one into the limelight, and our hero, of course, must linger where the light beats around the throne.

Where this would-be satellite shines is in the election of officers and standing committees. He always has a slate ready, and by schemes, known only to men of this type, he succeeds for a time in electing to office those whom he can influence and control. Power thus achieved he trades upon for personal gain.

Medical societies, which could have become a power in advancing scientific

medicine, have been rendered inert through the baneful influence of the professional medical politician. The sadness that creeps into this problem is the fact that the condition is brought about by a slow insidious process; and before the society is aroused to its true condition, its usefulness as a scientific body is well nigh, if not entirely, gone. In this, as in tuberculosis, the victim is fatally stricken before a diagnosis is made.

The scientific society is no place for politics, especially in the sciences of medicine and dentistry. Human life and happiness are at stake. The members of these two societies are dealing with the greatest of all problems—the health of their clientele. The honest devotees in these two professions are deeply in earnest. Their goal is perfection in technic in diagnosis and treatment, and in the attainment of a broader understanding of the work before them. Petty politics do not interest them, and should not be allowed to interfere with the efficiency of their scientific societies.

Mendel's law gives us the great and the small, the morally strong and the criminal. The working of this law provides material from which those who must rule can be selected, and it leaves the great majority who are to be ruled; but the divine right of kings has been relegated to oblivion by the more just and righteous principles of democracy. The ruler must be the servant and unless you can serve you can not rule. The professional politician in scientific societies has no conception of service except that which benefits him most. Altruism is an unknown term to him. He cares for nothing except that which brings riches to his coffers or laurels to his beetle brow. To him truth in science is a strange, unknown term. Fortunately the reigns of these individuals do not last long, but they are tiresome and discouraging while they do last.

It is hoped that dental societies will purge themselves of such influences, if any exist in their midst, and will see to it that those who are honored with offices of trust, are those who are entitled to enjoy such honors by first having served.

Students and the Draft

THERE are 18,000 medical students in this country, all of whom are liable to the draft for military service—not as medical officers or hospital assistants, but as private soldiers. There is no provision under the present draft law for exempting these men or for placing them in a special department of the army. Unless a rule is laid down to cover the case, these medical students and all physicians who are drafted will not go into medical service in the army but will be put into the trenches.

There are 10,000 dentistry and 6,000 pharmacy students in the schools of the United States in addition to the large body of undergraduate students in the colleges and universities who are taking preparatory work for medicine, dentistry and pharmacy. Under the present draft law these men will be sent into the trenches to serve as private soldiers along with the regular troops. If these men are sent to the trenches their years of technical training will be wasted. Commissioner Claxton has been urging all men who are enrolled in technical courses to continue their work to completion. Even Secretary Baker says that

educated men are sorely needed by this country. And yet the administration has failed to make any attempt to exempt the young students who are to be the educated men of tomorrow.

Dr. Franklin H. Martin of the Council of National Defense has expressed himself in favor of a petition that is now being circulated among New York physicians which asks that physicians between the ages of 21 and 45 be drafted to fill up the ranks in the army medical corps, but specifically states that such a draft should exempt graduate physicians, students of medicine, pre-medical students as long as these retain their medical status, and those physicians whose services at home are essential to the public welfare in health departments, hospitals, medical colleges and isolated communities.

The medical profession would welcome such a draft law as this because it would be just and fair to the people and to the body of physicians. The failure of the present law to foresee the necessity of exempting these certain classes of technical men, and of drafting the really available men into positions which they are competent to fill rather than into the ranks of private soldiers, indicates the carelessness with which the exemption board did its work. England allowed her chemists, physicians and dentists to go with the first troops and today England is crying for skilled technical men of all kinds. England's experience was well known in this country, but the authorities here seem to be disregarding it.

The Medical and Dental Student and Conscription

LET us hope that America does not make the same fatal mistake of which Great Britain was guilty in the early days of the war by allowing her trained scientists to go to the trenches and to a needless sacrifice.

Undoubtedly our Surgeon General intends to make some provision for medical and dental students to continue their studies in order that the medical department of our army and our civilian population be amply provided for at all times with an adequate number of well trained and efficient physicians and dentists.

It does not take much effort to show conclusively that a real need for physicians and dentists will manifest itself very soon if such a provision is not made; neither does it take much effort to convince one of the logic of such a provision. An army is only efficient and an effective fighting machine, in proportion to the condition of the health of the individuals. Plenty of well trained physicians, surgeons, and dentists in the American Army will be one of the prime factors in its efficiency. Where is the logic and the common sense in taking a second, third, or fourth year medical student, a junior or senior dental student, away from college and putting him in the trenches, when a little more time given to him will make him ten times more valuable to his country? Surely the wisdom credited to the Washington authorities can see this and surely some action will be taken in time to prevent the evil that undoubtedly will follow failure to exempt or furlough such men.

At this time a representation in the Cabinet for the protection of the health of America would be invaluable. Such a portfolio with a well trained physician at its head would be quick to recognize existing needs and could secure the

needed legislation. In the absence of such a department, it is necessary for every individual to do his bit in calling to the attention of his Congressman, his Senator, the Surgeon General, and Secretary of War, Baker, the danger ahead if such a provision is not made. To the members of the medical and the dental professions, more than anyone else, is this need apparent; and they must be the ones to sound the alarm. The *Journal of the American Medical Association* had a timely editorial in the August 11th issue. Dr. Franklin Martin, Chairman of the Council of National Defense, recognizes the danger, and can be depended upon to do all in his power to stay the making of this mistake, but Dr. Martin must be assisted and given the support of every physician and dentist.

The American Society of Orthodontists, one of the oldest and most powerful dental societies in America, will meet early in September. Let them at this time take united action with reference to this and do their utmost to stay the coming of this evil. In October the National Dental Association meets. This society is to the dental profession what the American Medical Association is to the medical profession. Let this society at its October meeting take action and convey to the Surgeon General and to Secretary Baker, its feelings with reference to the matter.

This is the time of the melting pot. It makes no difference how you may have felt previous to the entry of America into the war, you must now bury all feelings and let your desire to serve transcend all else. Every physician and dentist knows that this falling off in the supply of the guardians of the soldiers' and civilians' health is a danger, and they should try to help avert it. Start writing and talking about it—and start now.

On the Treatment of Children's Teeth

AT a recent meeting of the Odontological Society of New South Wales, reported in the *Commonwealth Dental Review*, the following question was asked, followed by the discussion which is herewith noted.

"*Question:* A child, under 5 years of age, suffering from ulcerative stomatitis, the cheeks and tongue being badly affected, and practically all the teeth decayed and broken out of recognition. Should the teeth be extracted?

"From many interesting replies we select the following:—

"Dr. Basil Jones: I have seen a great deal of this trouble (mostly at the Children's Hospital), and my practice has been to remove the teeth that are affected and showing signs of pus, then cleanse the gums and mucous membrane with one part peroxide of hydrogen to three of water, and finish up by painting the whole of the mouth with tincture of iodine. With this application and the use of a mild potassium chlorate mouth wash the trouble will clear up very quickly. I think it is criminal to remove the whole of the teeth, the second dentition thereby being affected.

"Dr. P. A. Burton: I think it is a great mistake to extract any of the first teeth of a child, even if the pulp is putrescent. In a few cases extraction may be unavoidable, but where pus is present I open them up when possible, or otherwise let the pus out as best I can. These teeth eventually become pretty healthy, and any trouble will be only very temporary.

"Dr. Grosse: It is better to risk the second dentition than the patient's health. I never take out any good teeth, but I think it is a mistake to leave a child with a bed of germ-producing teeth, and have them go on discharging pus simply for the sake of the second dentition.

"Dr. N. Short: I am glad Dr. Grosse has spoken in that way. I was rather startled by the remarks of the two previous gentlemen, because I did not think it tends to make the medical profession think well of us, or that we are thinking in a scientific way, to keep the roots with pus flowing into the mouth. If we can keep the last temporary molar in position, I think we are doing well. Of course, it depends largely upon the patient, but in the case mentioned in the question it is certainly one of a very anæmic child; that child needs to have as much good nourishment as possible taken into its body, free from any possibility of a neutralizing effect from carious and diseased roots and pus sinuses. Where there is pus and pain it is better to sacrifice the teeth and produce a healthy child, with chances of the second dentition being placed in the proper alignment. Develop the child first of all. I think it ought to go forth from our profession that we believe in eradicating pus.

"Dr. Oscar Paul: I agree with most of the previous speakers to some extent, but I do not think any rule can be followed to suit all cases. Of course, it depends just how far the permanent teeth have developed. If they are up sufficiently in the alveolar process to maintain and hold the space that they are eventually to erupt into, then the temporary teeth can be taken out, for the simple reason that the permanents are below. It depends also upon the conditions of the child, as the previous speakers have stated. If the child's health is suffering materially owing to their presence, it is better to extract the teeth and be prepared for the malocclusion which undoubtedly in many cases will follow later. I have seen mouths in which it would be better to sacrifice the temporary teeth; they were in a bad condition, with pus flowing from the area around the teeth. A condition of the teeth with abscesses on the roots will not only prevent the development of the maxilla itself, but also the eruption of the permanent teeth. In these cases it is certainly better to extract. At the same time I think there are too many temporary teeth extracted. Many could be saved to do a considerable amount of work; some dentists extract teeth that the child could get good service from, and which are not causing any ill results by their presence, but are aiding in the development of the maxillæ.

"Dr. Deck: Many cases of marked malpositions of the permanent teeth are directly due to the nonabsorption or only partial absorption of the roots of nonvital deciduous teeth; and so, while I believe in attempting to treat and retain as many teeth as possible in such a case as this, great care must be exercised that they are not allowed to remain so long in place as to produce some malpositions of their successors. Another thing that I am sure most of you will have noticed, as being a result of leaving these septic deciduous roots in place, is that the crown of the permanent tooth is markedly eroded and pitted from the action of the pus, and is more liable to be attacked by caries, so that I think this is another reason why one should remove chronically abscessed deciduous teeth."

Seventeenth Annual Meeting of the American Society of Orthodontists

ELSEWHERE we print the complete program of the Seventeenth Annual Meeting of the American Society of Orthodontists, to be held in Excelsior Springs, Mo., September 5, 6, 7, and 8, 1917. The program for this meeting is an attractive one. Papers will be read on collateral subjects by men, prominent in their work, that will be of interest to orthodontists.

It is an encouraging sign to see specialists interested in matters not directly concerned with their work, but which indirectly has an important bearing on it. This signifies that specialism is broadening and argues well for its future.

Excelsior Springs is a delightful place for this meeting. It is within two hours' ride from Kansas City, one of our great railroad centers. The Elms, one of the best resort hotels in America, will furnish accommodation that will satisfy the most exacting. One of the attractions of this hostelry is a well maintained golf course.

Make your plans now to attend this meeting.

The program committee have worked hard to secure men of great ability with an international reputation to read papers and give clinics, and they have succeeded. Show your appreciation of their work and your interest in orthodontia by attending this meeting. Bring your golf clubs with you.

Wednesday, Sept. 5.

9:00 Meeting of the Board of Censors.

10:00 President's Address.
M. N. Federspiel, Milwaukee.
Discussion opened by:
A. H. Suggett, San Francisco.
C. A. Hawley, Washington.

11:00 Report of the Board of Censors.
Election of New Members.
Reports of Committees.

2:00 A Case from Practice: A Complete Presentation of the Details of its Treatment.
Calvin S. Case, Chicago.
Discussion opened by:
F. C. Kemple, New York.
S. M. Weeks, Philadelphia.

3:00 A Further Study of Prenatal Causes of Dentofacial Deformities.
B. W. Weinberger, New York.
Discussion opened by:
Martin Dewey, Chicago.
W. J. Brady, Kansas City.

4:00 The Teeth in Sorcery and Magic.
C. C. Allen, Kansas City.
Discussion opened by:
R. Ottolengui, New York.
M. T. Watson, Detroit.

Thursday, Sept. 6.

9:00 Further Experience with the .020 Arch-wire.
Ray D. Robinson, Los Angeles.
Discussion opened by:
D. W. Flint, Pittsburgh.
A. H. Suggett, San Francisco.

10:00 The Surgical Treatment of Extreme Malformations Involving the Jaws, Tongue, etc.
Gordon New, Rochester, Minn.
Discussion opened by:
M. H. Cryer, Philadelphia.
M. N. Federspiel, Milwaukee.

11:00 The Oral Efficiency of Therapeutic Preparations.
H. Prinz, Philadelphia.
Discussion opened by:
F. S. McKay, Colorado Springs.
L. W. Baker, Boston.

2:00 Orthophotography and Multiview Projections.
R. Hanau, Pittsburgh.
Discussion opened by:
W. A. McCarter, Topeka.
R. Waldron, Newark.

3:00 Constitutional Diseases in Infancy and Dentition.
G. Lippmann, St. Louis.

Discussion opened by:
H. Prinz, Philadelphia.
A. McCann, New York.

4:00 The Proper Feeding of Growing Children During the Transitional Period from the Deciduous to the Permanent Denture.
Alfred McCann, New York.

Discussion opened by:
E. A. Bogue, New York.
G. Lippmann, St. Louis.

Friday, Sept. 7.

9:00 The Indirect Method of Anchor-band Construction.
Martin Dewey, Chicago.

Discussion opened by:
W. A. Coston, Topeka.
C. A. Hawley, Washington.

10:00 The Concealed Labial Arch-wire with Spring Extensions.
L. S. Lourie, Chicago.

Discussion opened by:
Martin Dewey, Chicago.
W. H. Ellis, Buffalo.

11:00 Practical Radiography for the Orthodontist.
E. H. Skinner, Kansas City.

Discussion opened by:
S. P. Cameron, Philadelphia.
J. D. McCoy, Los Angeles.

2:00 A Summary of the Results of Metallurgical and Physical Researches and Their Practical Application in Orthodontia.
Louis J. Weinstein, New York.

Discussion opened by:
C. J. Grieves, Baltimore.
C. S. Case, Chicago.

4:00 The Teaching of Orthodontics from the Standpoint of the Student.
W. C. Fisher, New York.

Discussion opened by:
M. Dewey, Chicago.
H. Pullen, Buffalo.

5:00 Unfinished Business.

Saturday, Sept. 8.

9:00 *Clinics.*
L. J. Weinstein
Practical Demonstration of Metals and Alloys as Applied to Orthodontia.
First Clinic, 9:00-10:00.
Second Clinic, 10:15-11:15.
Third Clinic, 11:30-12:30.

W. A. McCarter
A Practical Method of Orthodontic Photography.

Grafton Munroe
Pullen's Fracture Band for Use in War Surgery.
Also Case Clinic.

C. S. Case, Carl B. Case
New Midget Appliances for Deciduous Dentures.
Construction of a Six-band Retainer.
Demonstration of the Contouring Apparatus.

F. C. Rogers
Chart for Trimming Plaster Models.

Alden Carpenter
Appliances for Army Fractures.

B. F. Gray
Case Report of Retarded Development.

H. Keeler
Rotation and Retention of Central and Lateral Incisors.

R. C. Willett
Subject to be announced.

R. Waldron
Subject to be announced.

C. R. Baker
Table Clinic.

B. E. Lischer
Life-size Photographs of Dentofacial Deformities.

W. A. Coston
Band Construction Over Amalgam Models.

O. A. Oliver
Impressions and Casts.

V. H. Jackson
Case Records.

11:30 Final Session.
Installation of Officers.
Adjournment.

The Chaos of Oral Prophylaxis

THERE is no one who will deny the value of oral prophylaxis as an adjunct to the health of the individual or the preservation and care of the oral cavity. The oral prophylaxis propaganda, which started several years ago, has reached a considerable proportion and the importance of it is being recognized by the medical and dental professions and by the laity. However, notwithstanding the number of years the doctrine of oral prophylaxis has been preached, to one sitting up in the gallery and observing the proceedings, it is a state of affairs that seems to be more or less chaotic at the present time. During the past few months we have been privileged to listen to papers by a number of specialists along oral prophylaxis lines. Strange as it may seem, these specialists have been agreed only on one thing, and that is the value of oral prophylaxis in preserving the health of the teeth and the oral cavity, the value of oral prophylaxis in the health of the individual, and almost universally summing up their statement by saying "that a clean tooth never decays." These are about the only factors that oral prophylaxis specialists seem to be agreed upon.

We find a number of them advocating the use of the toothbrush and equally as large a number enthusiastically decrying its use. We find those who want a toothbrush which presents a large number of rows of bristles, sufficiently large to brush the upper and lower teeth at the same time, and we find those who claim that the toothbrush should have only one row of bristles, and taking the matter further, we find that the poor old toothbrush is even discarded entirely by some specialists.

Taking the question of tooth paste, we find them equally divided; some claiming that tooth pastes should possess grit for polishing the teeth; others claiming that they should possess none; some claiming that one should use only a small quantity of tooth powder on the brush while others claim a large amount should be used, a sufficiently large amount of tooth powder so the bacilli will become confused, become mixed up in the tooth powder and be washed off with a stream of water. We find them divided the same in regard to tooth paste, some claiming that tooth paste produces deleterious results by clinging around the gingiva, making a deposit or debris in which the bacteria grow, others claim that the tooth paste mixes the bacteria, rolls them over and over and causes them to be washed out of the oral cavity.

Likewise in the question of mouth washes: Some advocate antiseptic mouth washes containing all sorts of ingredients or medicines and strongly astringent and antiseptic to mild antiseptics such as boracic acid, soda, and salt solution. There are even enthusiasts who claim that the best mouth wash is nothing but pure water. Each one of these men is equally positive that the results he is accomplishing are better than the results the other man is accomplishing.

If one bases his observation only upon listening to these gentlemen talk, or ladies, as the case may be, the matter becomes very confusing and it is almost impossible to draw a line of deduction of the statement which the oral prophylaxis specialist makes. We find those who advocate the active use of the tape containing a gritty powder for polishing between the teeth. We find those

who are equally enthusiastic in decrying the use of the tape or silk floss as being factors which make grooves in the proximal surfaces of the teeth, injure the gum tissue, and assure the loss of the teeth provided a tape charged with a powder is used. Others are enthusiasts in using a polishing strip for polishing the proximal surfaces of the teeth, while still others are just as positive in decrying the evil effects derived from it.

If we follow the oral prophylaxis specialist further in his argument, we are forced to conclude that a great many of them pass the point where they cease to be oral prophylaxis specialists and become treaters of pathologic conditions. The treatment of pathologic conditions in the oral cavity is almost as chaotic as the treatment of the mouth along prophylactic lines. It is our opinion that there should be some differentiation made between oral prophylactic treatment and the treatment of pathologic conditions. We have always believed that a prophylactic measure was one which prevented, while the treatment of pathologic conditions is one that has for its object the curing of a disease and the reestablishing of healthy conditions in the parts. After a pathologic condition has been treated and the parts have become healthy or the disease has been eradicated, then prophylactic measures or prophylactic treatment again becomes the proper thing. The further we go in the study of pathologic conditions the more muddled up and troubled the water becomes to one who is simply trying to base his diagnosis or his prognosis upon conditions as he hears them explained by specialists along these lines.

If we were compelled to make our conclusions from the statements which we have heard from men engaged in the practice of oral prophylaxis, about the only positive thing that we could say is that the oral cavity should be cleaned. In the various statements which have been made it does not make so much difference what is used to clean it—whether absorbent cotton or toothbrush or toothpicks, orange wood sticks or rubber cups, pumice stone or castile soap—the important proposition is that it be kept cleaned. Another factor which a great many men overlook is the fact that the treatment which will be indicated for one individual will not be so successful for another. This is proved by the fact that a great many individuals pay little attention to the care of the oral cavity, yet the teeth and mouth are reasonably clean. This is because they are living in an environment, leading a life, using food, giving a certain amount of usage to their teeth, performing the functions of mastication, which functions or acts accomplish in a natural manner the things which have been intended by nature. It must also be remembered that in one mouth a gritty tooth powder would be desirable especially if the deposits upon the teeth were very gelatinous and gummy.

It must also be remembered that the use of gritty tooth powder for the cleaning of teeth as a prophylactic measure may become an objectionable thing in the mouth of the individual who possesses pathologic conditions, pockets around the teeth where the gritty substance in the tooth powder or tooth paste may collect and therefore become a foreign irritant. With a normally shaped tooth and a normal gingival marginal ridge and a normal development of the gum tissue around the teeth, there is very little possibility for the gritty substance of a tooth powder or a tooth paste to get down around the gingival

margin of the tooth and cause any trouble. It must also be remembered that in certain mouths an alkaline mouth wash will be desirable while in others an absolutely neutral mouth wash would be indicated, and in some even an acid mouth wash would be a desirable thing. In other words, the state of health or the condition of the oral cavity should be made an indication for the kind of mouth wash to be used and the same plan of treatment should not be used on all patients nor the same plan of oral prophylactic treatment employed in all individuals. If every individual lived exactly the same kind of a life, had the same kind of diet, followed the same habits, there is no question but what the same treatment would be advantageous in each case. Therefore it seems to us that the great trouble with oral prophylaxis at the present time is the majority of practitioners are trying to make one treatment suit all individuals. They are trying to make everybody live according to the same plan so far as the care of their mouth is concerned and this is not rational until everybody lives according to the same plan as regards habits, diet, and other environments. In order to overcome the chaotic condition which is present in the treatment of oral prophylaxis today the problem must be approached not from the angle of treatment but from the angle of diagnosis or a clearer and more scientific understanding of the needs of the oral cavity before a line of treatment is indicated. There should be more careful study of the analysis of the saliva, the food habits of the individual, the natural tendency of the diet to keep the teeth clean or to do otherwise; then a proper line of treatment could be established for each individual which would do him more good and be of much greater benefit than a fixed treatment applied to every individual whether indicated or not.

A Word to the Radiographer

LET us reason together and see if we can not be mutually helpful one to the other, and serve the people better than we are doing. We—the men who do not make x-ray pictures—need your aid in many ways, and we cheerfully accord to you the ability to produce a better picture than we could possibly do. But we want you to remember this one thing and abide by it: you have absolutely no right to diagnose any case and pass your opinion upon it without consultation with the dentist who has had the case in charge. No x-ray evidence should ever be taken except in conjunction with the clinical history of the case. Not that we ask you to merely take a picture and remain passive in the matter. We welcome your opinion stated to us frankly, whether that opinion is right or wrong. You may be able to detect evidence in a picture that we would overlook, and we thank you for calling our attention to it. But we ask you to cease from this time making a diagnosis to the patient, and writing those mystic and formidable legends on x-ray pictures, "pus-pockets," "infection," etc., etc., and handing it to the patient.—*Commonwealth Dental Review.*